Ontario
Ministry of Transportation

Environmental Assessment Report
One - Stage Submission

Highway 400 - Highway 404
Extension Link (Bradford Bypass)
W.P. 377-90-00

McCORMICK RANKIN
CORPORATION

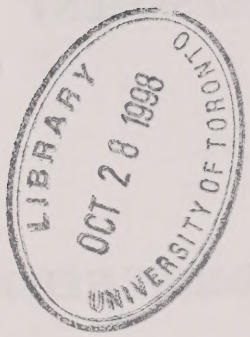
December 1997

HIGHWAY 400 - HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS)

ROUTE PLANNING and ENVIRONMENTAL ASSESSMENT STUDY

ENVIRONMENTAL ASSESSMENT REPORT

December, 1997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PREFACE

This Environmental Assessment Report documents an Environmental Assessment (EA) study undertaken by the Ministry of Transportation of Ontario for a new road link between Highway 400 and the extension of Highway 404.

This study followed a consultation process which included external agency, municipal staff and council reviews, and the public through consultation sessions at each phase of the study. The study also incorporated additional presentations and meetings with interested groups or individuals to identify and address concerns.

Note

All references in the study documentation to Highway 11 north of Bradford are superseded following transfer of the roadway to Simcoe County in 1997. It is now known as Simcoe County Road 4, or Yonge Street. Also, although the study was officially called the Highway 400 - Highway 404 Extension Link Route Planning and Environmental Assessment Study, it was commonly referred to as the Bradford Bypass Study.

EXECUTIVE SUMMARY

E.1 THE UNDERTAKING - ENVIRONMENTAL ASSESSMENT APPROVALS BEING SOUGHT

The undertaking for which approvals are being sought is a 16.2 km rural 4-lane controlled access freeway located in the County of Simcoe and Regional Municipality of York. The Recommended Plan for the Highway 400 - Highway 404 Extension Link is shown on Exhibit E-1. The Recommended Plan, as a freeway, connects Highway 400 in Bradford West Gwillimbury to the proposed extension of Highway 404 in East Gwillimbury. It is located north of, and parallel to Highway 88 in Bradford West Gwillimbury and Queensville Sideroad (York Road (YR) 77) in East Gwillimbury. The Recommended Plan as it relates to the broad transportation network north of the Greater Toronto Area is shown in Exhibit E-2.

This report documents the Environmental Assessment (EA) process followed per the **Environmental Assessment Act, RSO 1990**. The Act was amended in 1997 and incorporated a transition provision for those submissions made by the end of 1997 to be processed under the rules of the earlier Act. **Having completed the EA study prior to the end of 1997, the MTO is submitting the current 400 - 404 Link EA Report under the transition provisions of the 1997 Act.** As such, MTO has requested to have Part II of the previous EA Act, and the provisions of Part II of the new Act with respect to mediation, if these are required, and the Section 12.2 activities permitted before approval, to apply to this EA.

This submission includes the following:

- purpose of the undertaking (Section E.3 in this Executive Summary and 1.1.1 in the main body of the report)
- the environmental assessment process followed (Section E.2 and 2.1);
- statement of problem/opportunity (Section E.2.1 and 3.1.1);
- the alternatives considered (Sections E.2, 3.5 and 4.2);
- a description of the environmental effects associated with the project and the alternatives considered (Sections E.2, E.6, 1.1.3 and 5.4); and
- an outline of the commitment for further work to be undertaken relative to identified "environmentally significant areas/issues" (Section E.5, E.6, 5.4 and Exhibit 5-6).

Acceptance of the Environmental Assessment document and approval of the undertaking by the Minister of Environment and Energy will allow the Ministry of Transportation to:

- designate the right-of-way for the recommended alignment and file a designation plan under the Public Transportation and Highway Improvement Act;
- acquire property for implementation of the undertaking;
- refine the alignment and right-of-way requirements during the design phase;
- design, construct, operate and maintain a 4-lane freeway facility within the right-of-way; and
- initiate a process for addressing new concerns regarding the undertaking.

Proceeding to implementation will also require securing all necessary additional approvals under provincial and federal statutes.

The approvals being sought by this EA and the commitments made in the EA will apply to and be binding upon the Ministry of Transportation of Ontario, its agents, successors, transferees and/or assignees, and will be applicable to the design, construction, operation and maintenance of the undertaking.

The following sections of the Executive Summary documents the process undertaken in identifying the Recommended Plan. A more detailed discussion of the following can be found in relevant sections of the main report.

E.2 DOCUMENTATION FOR THE UNDERTAKING

In order to outline the planning process which the Ministry of Transportation intended to follow for this study, and to solicit both public and external (non-MTO) agency comment on the proposed process, a draft Environmental Assessment Proposal (EAP) Report was prepared in 1993. The report followed the Ministry of the Environment's "EAP Guidelines - 1992" and specifically addressed the following:

- need and justification
- the area to be studied
- the transportation alternatives to be considered
- the screening and evaluation process to be applied to the transportation alternatives; and
- the public and agency consultation to be undertaken

The EAP was revised and updated (incorporating public and agency comments) and published as a final document in September 1994. The Final EAP included Exhibit E-3 which summarizes the study process. The consultation process is described separately in Section E.4.

E.2.1 Problems and Opportunities

As documented in the EAP and in the MTO's Highway 404 / 89 Overview Study (1989), the current study addresses several transportation problems which have been identified in the northern part of York Region and southeastern Simcoe County (see Exhibit E-4). The identified problems are related to the Ministry's mandate to provide for the safe, efficient movement of people and goods between regions and between urban areas. Associated with the problems are unique and important opportunities which may play a significant role in the resolution of the problems.

Rationale for Problem/Opportunity Statement

The analysis of municipal development plans indicated that there will be a continuation of dramatic growth in travel demand which has been characteristic of York Region and Simcoe County for the past 25 years. This growth, primarily in commuter travel, will eventually lead to increased congestion on key east-west roadways linking Highway 400 to the future extension of Highway 404. Current approved plans to upgrade regional roads will handle only a fraction of these trips.

NOTE: HWY. 88 WILL BE BECOME A SIMCOE COUNTY ROAD ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

RECOMMENDED PLAN

EXHIBIT
E-1

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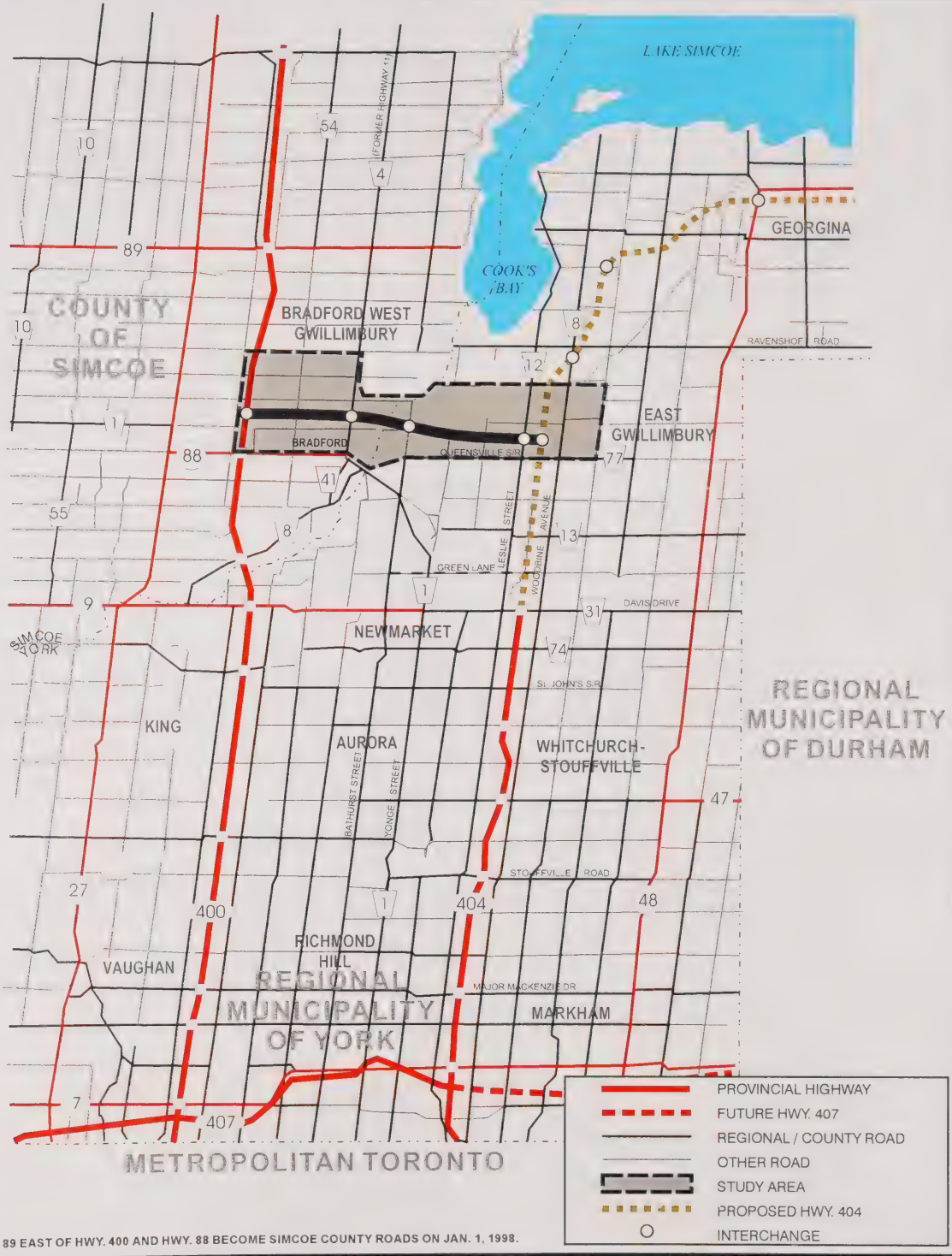


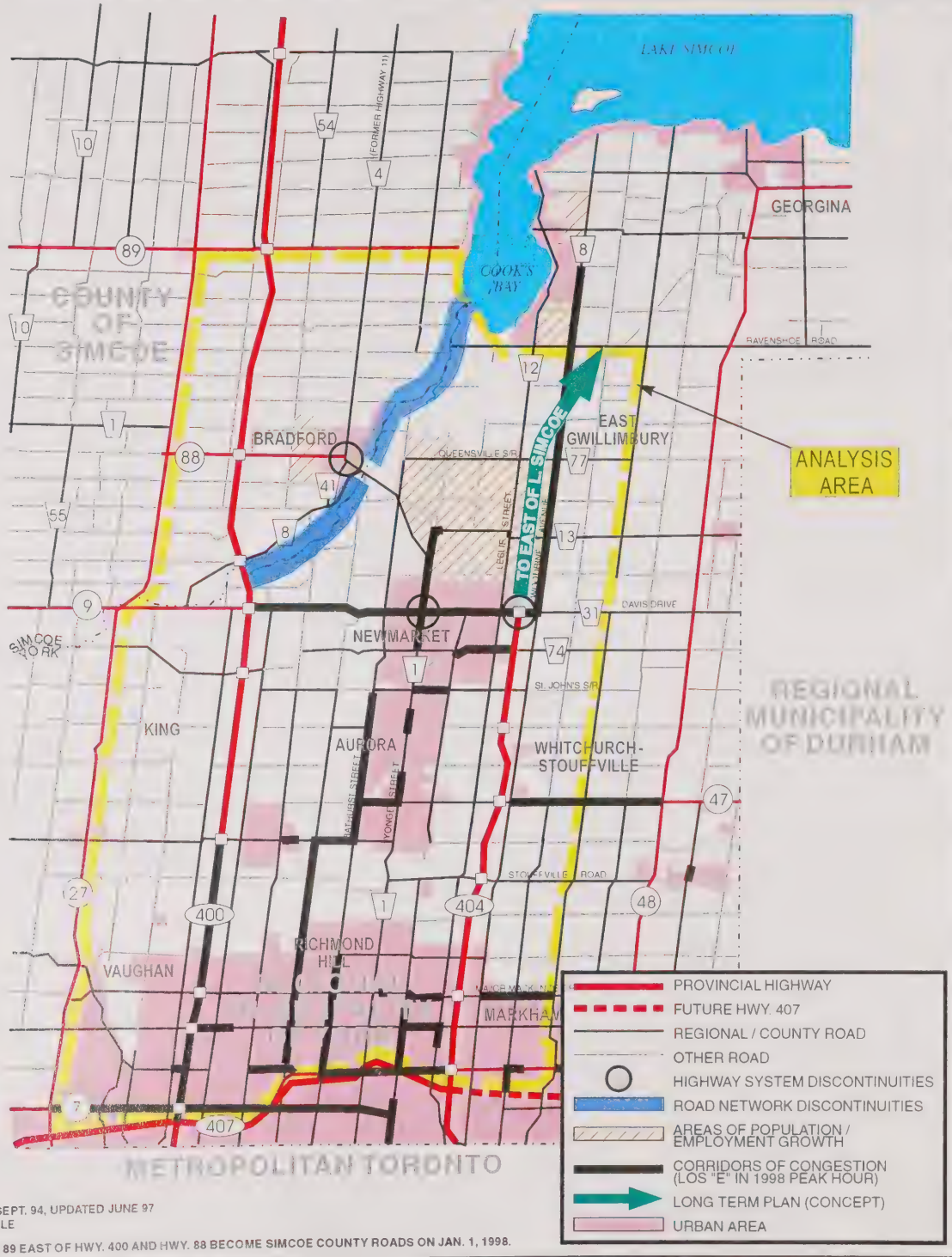
NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	RECOMMENDED PLAN (REGIONAL CONTEXT)	EXHIBIT E-2

ENVIRONMENTAL ASSESSMENT PROCESS

Study Steps	Timeframe	Description
Problem/ Opportunity Statement	1993	Location and extent of problems / opportunities reviewed as part of draft Environmental Assessment Proposal
Alternatives to the Undertaking	1993	All modes considered
		FIRST ROUND OF PUBLIC CONSULTATION
Analysis of the Alternatives to the Undertaking	1993	Carry forward "Roadway Infrastructure Addition"
Corridor Assessment	1993/94	"New Roadway " corridors assessed; travel demand modelling undertaken
Focusing of Study Area	1994	Preferred corridor is Bradford ; define the study area on that basis
Identify Alternative Routes	1994	Reasonable freeway routes drawn
		SECOND ROUND OF PUBLIC CONSULTATION
Analysis of Alternative Routes	1994/95	Detailed analysis using factors, criteria and indicators
Evaluation of Alternative Routes	1995/96	Evaluation based on public and Project Team weighting of criteria
Identified Additional Routes		
Definition of Technically Preferred Route	1996	Project Team's technical preference and its rationale placed before the public for review
		THIRD ROUND OF PUBLIC CONSULTATION
Refinement/Detailing of Preferred Route	1996	Finalize concept plan, based on public input and technical analysis as required
Preparation of Environmental Assessment Report (EAR)	1997	Document entire study process
Submission of EAR for Review and Approval	1997	Simultaneous public and agency review under the Environmental Assessment Act leads to approval decision by the Minister of Environment and Energy

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	STUDY PROCESS CHART	EXHIBIT **E-3**



MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE

NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	TRANSPORTATION PROBLEM AREAS	EXHIBIT E-4

A travel demand analysis carried out for this study (refer to Appendix A of the main report for detail) identified the extent of the long term capacity shortfall for east-west travel in northern York Region. The travel demand analysis indicated that demand will exceed available capacity even accounting for planned road improvements such as those in the Highway 9 corridor.

Exhibit E-4 summarizes the locations of the key problems areas. In particular, the area of greatest concern is roughly that bounded by Highway 400, Lake Simcoe, Leslie Street / Woodbine Avenue, and Highway 9. Significant growth is projected in this area and it is also where long distance north-south traffic must "split" to travel around either the east or west side of Lake Simcoe.

It should be noted that this "east-west" travel demand is comprised in large part of long distance north-south trips making a crossover between Highway 400 and (extended) Highway 404. These highway trips are a provincial responsibility, and are distinct from locally-generated trips which may use a municipal road to access the provincial network. For this reason the location of a transportation link is not only determined on the basis of where it can serve the highest local demand. The location is related more to the potential network benefits, with local service being a secondary benefit.

In south-central Ontario, the major provincial highway network has been developed on a "cellular" framework. The strategic links between parallel corridors allow optimum mobility for those using the network as well as excellent access to the grid for cars and trucks within each "cell". The subject of the current study is one of the missing elements in the network - an east-west link in northern York Region between parallel Highways 400 and 404.

Finally, while some public concerns emerged over the course of the study regarding the location of a Highway 400-404 Link (somewhere between Hwy.407 and Lake Simcoe), there has been widespread agreement that the issues put forth in the problem/opportunity statement are valid and require resolution. **Therefore based on the need and justification of planning for a Highway 400-404 link the Project Team undertook an assessment of available alternatives within the analysis area as shown in Exhibit E-4.**

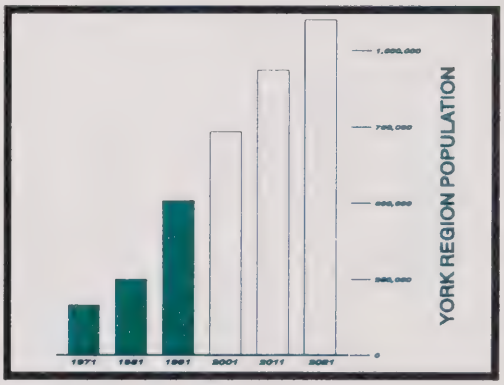
The identified problems are:

- **Traffic Problems** - Traffic operational and distribution problems (e.g. too many traffic signals and commuters/recreational users being forced to use local roads resulting in a poor Level of Service for drivers) exist as a result of the incomplete and fragmented nature of the provincial highway system in the study area, particularly with respect to the termination of provincial highways at lower-capacity municipal roadways (e.g. Highway 9 at Davis Drive and Highway 404 at Davis Drive in Newmarket).

HWY.11 IN BRADFORD

- **Road Discontinuities** - Inefficient, out-of-the-way travel results from the presence of physical (e.g. the Holland River) and operational discontinuities (e.g. high speed function of Hwy.88 west of Bradford, but low speed through Bradford with several traffic signals) in the major road network, particularly with respect to the barrier to east-west travel formed by the lack of a crossing of the Holland River between Simcoe County Road 4 (Highway 11) at Bradford northerly to Lake Simcoe.

- **Future Demand Growth Implications** - The current transportation system (i.e. road/rail network) is not adequate in terms of both capacity (i.e. space for addtional travellers) and location/orientation to accommodate future travel demand, particularly with respect to the significant growth in travel demand forecast for trips to, from, through and within northern York Region and southeastern Simcoe County.



- **Lack of Long Term Plan** - The transportation and land use concepts of municipal Official Plans in the study area rely to a considerable extent on the presence of the provincial highway network; the lack of a defined, approved long term highway network plan in the northern part of York Region and southern Simcoe County places constraints on the provincial and municipal planning process in the area.

Two significant opportunities are present with respect to transportation in the study area:

- **Relieve Congestion** - There is potential for an improved transportation system to relieve some roadways which are currently (or are forecast to be) severely congested, and which suffer consequences as a result of congestion in the form of higher noise levels, increased community disruption, decreased safety, and inhibition of development.

HOLLAND STREET IN BRADFORD

- **Protect Property** - The opportunity to define and protect (i.e. not allow development of) an adequate property envelope for the "ultimate" transportation system before all feasible routes / corridors are committed to other uses or are developed is in many cases a vital part of a successful community plan.

E.2.2 Rationale, Description and Assessment of Alternatives

The planning process for the this study primarily took the form of narrowing down alternatives, from the broad range of potential solutions down to the particular plan and concept ultimately put forward for approval. To do so required gathering relevant information with respect to the existing and future conditions in the analysis area so that the impacts (both positive and negative) of each alternative could be compared under different environmental factors. Gathering relevant information was undertaken at varying levels of detail through the process and was followed by the comparison of alternatives using a set of consistent and traceable factors developed specifically for the study.

To allow a satisfactory comparison to be made, information was gathered and grouped under five broad environmental factors: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. This framework is documented in Section 4.2 of the main report.

E.2.2.1 Alternatives to the Undertaking

The Environmental Assessment Act requires that a range of alternatives to the undertaking be considered, as well as alternative methods of carrying out the undertaking. There were four groups of "alternatives to the undertaking" which were initially considered in light of the identification of the problems/opportunities present within the analysis area southeastern Simcoe County. These were:

- Do Nothing (maintain existing conditions)
- Manage Transportation Demand (implement measures to reduce, shift, or eliminate transportation demand)
- Improve Existing Roadway and/or Roadway based Modes (e.g. transit)
- Introduce New Non-Roadway based Facilities and / or Non-Roadway based Modes (e.g. air travel, rail)

The evaluation of alternatives to the undertaking revealed the following:

i) Do Nothing

The "Do Nothing" approach is inherently incapable of resolving problems, and therefore was set aside and not actively pursued as a "solution".

ii) Manage Transportation Demand

The "Manage Demand" group of alternatives is intended to make the best use of the available infrastructure. This only applies if the existing infrastructure is capable of accommodating all of the travel demands placed on it.

Demand Management is most applicable to a particular site or corridor. An effective Demand Management program requires several conditions: convenient and beneficial alternatives to the single-occupant auto mode; congested roads, lack of parking, or high cost single occupant auto travel; dense land use with concentrated employment areas and transit-supportive urban planning; a clearly defined and controllable corridor; and a commitment from all involved agencies as well as an administrative framework for program implemention and operation. None of the conditions for a Demand Management program to be effective exists in the area under study, therefore this alternative was set aside and not considered further.

iii) Improve Existing Roadways and/or Roadway-Based Modes

- ***roadway operational improvements***: the existing signal operations in congested parts of the analysis area are already essentially optimized and incapable of accommodating the growth that will occur in York Region travel demand without further increased congestion. The concession-based roadway grid in the Bradford - Newmarket area is so large in scale and so lacking in intermediate alternative routes that there is little operational or routing flexibility in the existing road system. All vehicles must eventually use or cross the major road grid. Congestion resulting from the conflicts present at each such intersection will be accentuated with continued growth in demand. Therefore, this alternative was set aside as an alternative to the undertaking.

- ***roadway infrastructure improvements*** increase the capacity of the existing system through widening roads. However, discontinuities in the existing road network would remain and the additional lanes provided can quickly be filled by latent demand. The most congested areas are precisely those most sensitive to the impacts of widening (e.g. Holland Street - Bradford, Davis Drive - Newmarket) and the need to optimize capacity (e.g. by limiting access,

controlling all intersections, and adding lanes) conflicts with the local service aspect of arterial roads.

This alternative may work together with the "roadway infrastructure addition" method (see below) to create an effective solution, however, any such plan would not, on its own, be effective in addressing the problems and opportunities present this alternative was therefore set aside.

- ***roadway infrastructure addition*** - adding new highway or road links to the existing network is perhaps the most effective of all alternatives in addressing the discontinuity-related transportation problems in the study area. Benefits to all sectors of the transportation market (commuters, recreational travellers, goods movement, etc.) can potentially be provided. The cost and potential environmental impacts are drawbacks, but overall there is considerable merit in carrying forward this alternative for closer examination.

- ***new roadway based modes*** - implementing transit improvements such as new bus services is a relevant strategy only if supported by travel demand to the point where they can operate on a cost-effective basis. While there is some potential in the Yonge Street corridor for transit improvements, they would be of benefit to few recreational or long distance travellers. The alternative was therefore not considered a reasonable one to pursue further in resolving the problems and opportunities present.

iv) Introduce New Non-Roadway Based Facilities and/or Non-Roadway Based Modes

Non-roadway based modes such as air, water, passenger rail, or freight rail can contribute to addressing the travel needs of small sectors of the marketplace but are incapable of accommodating the diversity of trip types, directions, and modes with the convenience and cost-effectiveness of roadway-based modes. Therefore, this alternative was set aside and was not considered further.

Summary of Evaluation of Alternatives to the Undertaking

The only alternative to the undertaking determined to be reasonable to carry forward for more detailed study is ***roadway infrastructure addition*** as it would make a significant contribution towards addressing the problems/opportunities identified (either on its own or in combination with other alternatives). The remaining alternatives do not exhibit the potential to contribute significantly to the resolution of the identified problems/opportunities, and were therefore set aside .

E.2.2.2 Alternative Methods of Carrying Out the Undertaking

The previous section provided a basis for considering new roadways as a reasonable alternative to address the problems and opportunities present in the study area. The next step was to determine what alternative roadway types and locations should be considered.

A travel demand analysis summarized in Section 3.1.2.2 of the main report demonstrated that a two lane highway would be inadequate to accommodate the traffic volumes forecast in the long term for traffic crossing between Highways 400 and 404, and that a four-lane roadway is needed. Details of the Travel Demand Modelling may be found in Appendix A of the main report.

Consideration was given to the need for an arterial road type facility (at-grade intersections and entrances permitted) or a freeway type facility (grade-separated crossing roads with access only via interchanges). For a four-lane roadway to operate safely and efficiently, it is necessary to restrict, control, or eliminate entrances and intersections. Furthermore, the highest standards of safety, operation and capacity can only be met through grade separation with crossing roads, access via interchanges, and separation of opposing traffic streams (i.e. a freeway design as opposed to an arterial).

Due to its additional property requirements and interchange needs, planning on the basis of a freeway represents both a conservative plan in which the full extent of the facility's impact can be assessed and a prudent planning approach which allows the flexibility for staged implementation. Therefore, on the basis of travel demand, safety, and protection of adequate property to reflect the full impact of the roadway, **planning for a new route was on the basis of protecting for the ability to implement a four-lane freeway**.

E.2.3 Rationale for Study Area Boundaries

Initially, the study area was a broad "area of analysis" defined by the location(s) of the identified problems, together with the reasonable and possible location(s) for potential solutions (see Exhibit E-4).

In order to narrow the scope of the investigation, and define a more specific study area, an analysis of alternative freeway corridors was carried out to determine the preferred corridor within which to investigate corridor alternatives (refer to Section 3.5 of the main report). The corridors considered are shown in Exhibit E-5.

Results of the corridor analysis indicated that the best overall "package" of solutions was protection for a new freeway in the Bradford corridor rather than on an alignment closer to Newmarket. Therefore, the study area for the development of alternative freeway routes study area was defined as shown in Exhibit E-2. The rationale for the selection of the study area limits is included in Exhibit 3-17 of the main report.

The portion of the study area west of the Holland River is located in Simcoe County and the area to the east is within York Region. The local municipalities within the study area are the Town of

MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE

NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	**CORRIDORS**	**EXHIBIT E-5**

Bradford West Gwillimbury in Simcoe, and the Town of East Gwillimbury and King Township in York.

The study area is primarily composed of agricultural areas, forest and wetlands. The community of Bradford is the major population centre (approximately 18,000 residents); smaller communities located along the southern boundary of the study area include River Drive Park and Queensville.

E.2.4 Analysis and Evaluation of Freeway Route Alternatives

The freeway route alternatives are shown in Exhibit E-6. Due to the large number of alternatives and possible combinations, the alternatives were divided into sets of functionally similar route segments for the purposes of analysis and evaluation.

i) Analysis of Route Alternatives

Following the generation of reasonable freeway route alternatives in the study area, an analysis of the route alternatives for each segment was carried out based on a defined set of 16 evaluation criteria within five broad environmental factors of:

- Transportation
- Natural Environment
- Social Environment
- Economic Environment
- Cultural Environment

The analysis provided the Project Team with a complete and traceable description of each route alternative's impacts (both positive and negative) with respect to the environment under the five factors.

These factors were the same factors used for the analysis and evaluation of corridor alternatives as described in Section 3.5 of the main report. Each of the evaluation criteria were further defined by the use of indicators. These indicators were quantitative wherever possible; other indicators were subjective and were a combination of technical facts and professional judgement.

ii) Evaluation Process and Selection of Preferred Route

The evaluation to determine the technically preferred route was carried out by the Project Team based on analytic data and consideration of input provided by the public, interest groups, and affected government agencies. A detailed procedure including both Project Team and public input was used to evaluate the sets of alignment segments analyzed above.

The Project Team first carried out a weighting of the evaluation criteria by assigning a level of relative importance to each criteria. This approach aided in the evaluation of alternatives by essentially highlighting those criteria within the factors which were perceived as more important than others. Each alternative was then "scored" both against each other and against an absolute scale.

Prior to calculating the weighted scores, the Project Team used a Trade-Off method of evaluation to arrive at a consensus regarding the preferred route segment and the rationale for the preference. The Project Team then compared the relative and absolute weighted scores with the trade-off results and reached a consensus as to the preferred alternative(s).

The evaluation process was divided into four stages:

Stage 1	-	evaluation of 10 alternative sets comprised of 43 route segments
Stage 2	-	evaluation of route segments carried forward
Stage 3	-	further evaluation of the east section alternatives including future Highway 404 options to determine the Technically Preferred Route
Stage 4	-	evaluation of alignment refinements to the Technically Preferred Route

iii) Rationale for the Technically Preferred Route

As noted previously, because of the large number of route segments being considered in the evaluation process (see Exhibit E-6), functionally similar segments were organized into sets and examined in 3 distinct areas as follows:

- West of the Holland River (route segments linking points A-I)
- Crossing of the Holland River (river crossing routes through points J, K, L)
- East of the Holland River (route segments linking points M-Y)

Combinations of these route segments were developed into alternative routes which could be considered reasonable in getting from one point in the study area to another (e.g. segment DFL was considered reasonable, however, segment DEL was not). Therefore, the organization of functionally similar segments aided in determining the best routings west of the Holland River, east of the Holland River and across the Holland River.

For the analysis, west of the Holland River route segment combinations included a connection to each of the Holland River crossing segments, similarly east of the Holland River route segment combinations also included a connection to each of the Holland River crossings. Results of the evaluation provided in a flow-chart format in Exhibit E-7 is summarized below.

West of the Holland River, the CF route segment combination (when connected to crossings J, K or L) was preferred because:

- it would be the shortest, most direct route and therefore the least expensive as well as the most efficient (in terms of energy, time, etc.) for potential users;

- of the alternatives considered, CF would have the least natural environmental impacts (although very similar with DF). Impacts on fisheries, wildlife habitat (encroachment on green spaces/linkages), high quality forest removal, and groundwater were noted, but the Project Team was satisfied that adequate and appropriate mitigation measures were available;

- it would remove the least number of existing homes and provide the optimum route in terms of emergency response time;
- although BE would have marginally lower noise effects because of its proximity to residential areas, it was determined that potential noise impacts could be mitigated to acceptable levels; and
- it would not be so far away from Bradford as to lose the opportunity to support the local business sector, yet would have minimal direct effects on existing commercial/industrial areas. Impacts on the agricultural community would also be less than those of the alternative routes, as alignment CF largely follows existing lot lines so as to minimize farm severances, thereby maintaining large contiguous parcels of land for agricultural use.

East of the Holland River, the SY route segment combination (when connected to J, K or L) was preferred because:

- it would be the shortest, most direct route making it the least expensive, and would provide the best possible interchange configuration arrangements with Highway 404
- it would be better than the other combinations primarily for effects on fisheries, encroachment and loss of Class 1-3 wetland, and wildlife habitat; through consultation with the Ministry of Natural Resources and detailed field investigation, the Project Team was satisfied that impacts on those aspects of the environment could be adequately and appropriately mitigated;
- although it would have the most significant potential noise impacts (total number of houses affected) due to its proximity to residential areas in East Gwillimbury, this factor did not outweigh the other advantages of the route south of the wetland / golf course complex. The extent of the impact did, however, underline the need for mitigation; and

- it would have the least overall effects on existing major businesses (golf course and marina) and the agricultural community as the alignment follows existing lot lines where possible, minimizes severances, and maintains the viability of agricultural use for the resulting large contiguous parcels of land.


TURF FARM IN EAST GWILLIMBURY


LESLIE STREET IN EAST GWILLIMBURY

At the Holland River, the J routing was preferred over K and L when connected to the CF (west) and SY (east) route segment combinations because:

- it would be the shortest, most direct crossing, and have the best horizontal geometry making it the least expensive (primarily due to lower structure costs) and the safest route;
- when connected to the west and east segments would impact the least number of watercrossings and the least amount of wildlife habitat;
- although it would not be as good as L for wetland effects, the commitments made by the MTO for treatment of new routes in areas of wetlands kept the significance of this difference to a minimum;
- it would have the lowest noise impacts (although removing more houses) and be better than the others for aesthetics; and
- it would have the least impact on the quantity of Class 1-4 agricultural lands

The first three stages of the evaluation culminated in the synthesizing of the above segment-by-segment conclusions into a single continuous preferred route between Highway 400 and the extended Highway 404 (by which time the concurrent Highway 404 study had identified a preferred route "B" for the north-south route with which the Link could connect). The combined route CFJSYB was therefore identified as Technically Preferred (documented in Section 4.2.3 of the main report).

Subsequently, the Technically Preferred Route underwent a final review (Stage 4) to identify areas where adjustments/refinements could be made to improve the alignment by reducing overall potential effects as identified by the evaluation criteria. The proposed interchange locations were also confirmed at this time. Based on the preceding, the conceptual design of the Technically Preferred Route was carried out (documented in Section 5 of the main report) resulting in the identification of the Recommended Plan as presented in Exhibit E-2.

Finally, in considering all of the potential impacts, the preferred route was reviewed and determined to be a viable and appropriate solution to the problem/opportunity statment when compared against the "Do Nothing (maintain existing conditions)" alternative.

As an overall package the potential transportation benefits for all levels of traffic (provincial, regional and local) and support for municipal development plans offset the potential negative impacts on the Holland River wetland areas, agricultural lands, and adjacent residential communities. Where potential negative impacts remain, the use of appropriate mitigation measures is specified in the Recommended Plan to minimize the net effects.

While the "Do Nothing" alternative would maintain the status quo with regard to the natural environment and agriculture, existing provincial, regional, and local traffic problems will persist and worsen as travel demand continues to grow. Travel times, congestion, out-of-way travel, infiltration of heavy vehicles on local roads, and safety concerns will all continue to worsen under the "Do Nothing" situation and would be relieved by the preferred route. Ultimately, the lack of an adequate transportation network will encumber the ability of the affected municipalities to grow and develop as outlined in their respective Official Plans.

E.3 PURPOSE OF THE UNDERTAKING

As noted, the undertaking for which the Ministry of Transportation of Ontario (MTO) is seeking approval will be a freeway connecting Highway 400 in the Town of Bradford West Gwillimbury (County of Simcoe) to the proposed extension of Highway 404 in the Town of East Gwillimbury (Regional Municipality of York). The undertaking is shown in Exhibit E-1.
The purpose of the proposed roadway is to resolve several outstanding transportation problems and to address significant opportunities in the northern York / southern Simcoe area. The roadway will:

- together with the extension of Highway 404 from its current terminus at Davis Drive northerly to at least the 400 - 404 Link, significantly reduce the traffic operational and distribution problems currently experienced as a result of the incomplete and fragmented nature of the provincial highway system in the study area;

- by crossing the barrier to east-west travel formed by the Holland River, reduce the occurrence of inefficient out-of-way travel and the consequential waste of fuel, time, and money;

- contribute significantly to the ability of the area transportation system to accommodate future travel demand needs, particularly that generated by planned growth in population and employment within York and Simcoe;

- provide land use and transportation planning authorities in the affected area with a clearly-defined roadway plan and an associated property reserve, as input to their critical long-term planning decision-making process;

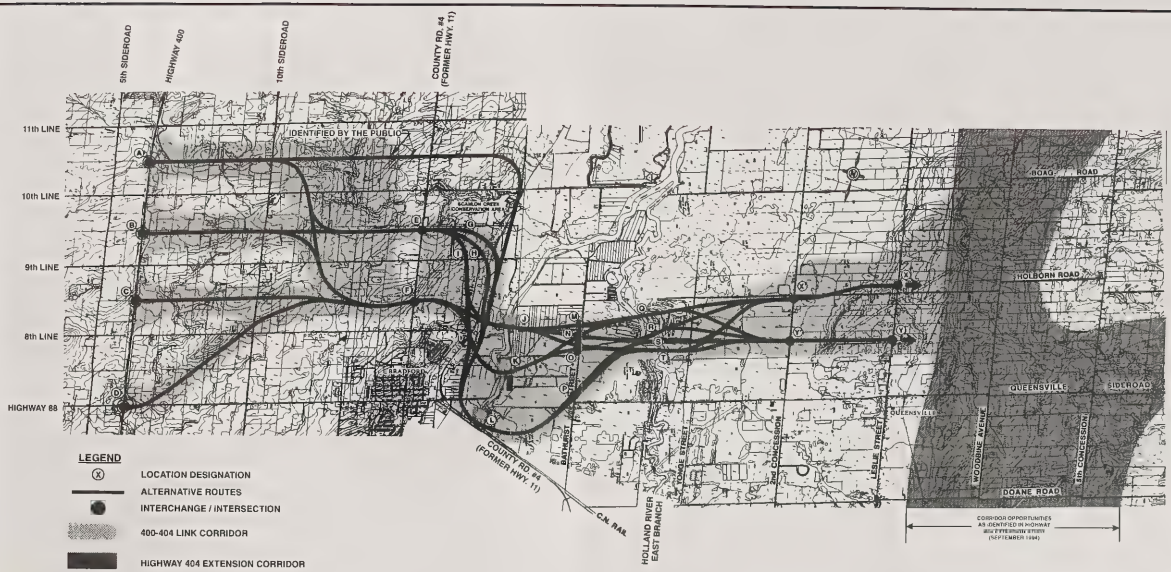
- relieve key municipal roads of long distance "provincial" inter-regional commuter and recreational traffic, thereby easing congestion and its associated negative impacts on existing communities; and

- by identifying and reserving the appropriate right-of-way now (prior to urban expansion occurring so as to affect or eliminate the feasibility of the corridor), be able to be implemented in a flexible, staged manner and with a minimum of disruption to the surrounding community.

Roadway Design

The proposed freeway linking Highway 400 and extended Highway 404 will be a 4-lane controlled access facility for its entire 16.2 km length. The freeway cross section will be rural (shoulders - no curbs) within a basic 100 m right-of-way and will have a design speed of 120 km/h. The cross section will incorporate a wide grassed median, with the exception of the two Holland River crossings east of Bradford where the median width will narrow to 8 m with a concrete barrier.

The continuity of all existing crossing roads will be maintained and each will ultimately be grade-separated with the freeway. There will be interchanges at 5 locations along the proposed route:

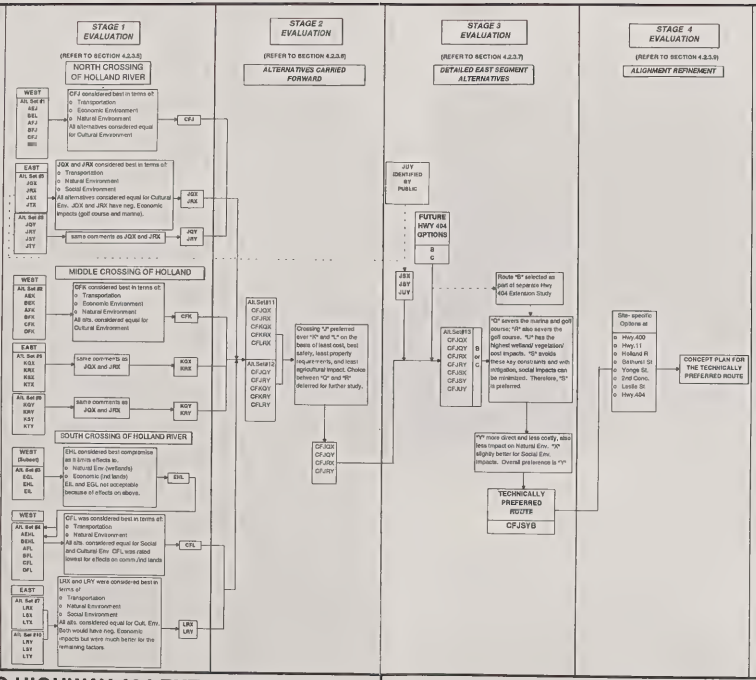


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

FREEWAY ROUTE ALTERNATIVES

EXHIBIT
E-6

SCALE



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EVALUATION SUMMARY OF ROUTE ALTERNATIVES

EXHIBIT
E-7

- Highway 400 (provincial freeway);
- Simcoe County Road 4 (Yonge Street) (former Highway 11);
- York Regional Road 38 (Bathurst Street);
- York Regional Road 12 (Leslie Street), partial interchange; and
- proposed extension of Highway 404 (provincial freeway)

Other grade-separated crossings include the following:

• 10 Sideroad (Middletown Road)	Town of Bradford West Gwillimbury Road
• Artesian Industrial Parkway	Town of Bradford West Gwillimbury Road
• CN Rail	CN North America - Newmarket Subdivision
• Yonge Street	Town of East Gwillimbury Road
• 2nd Concession Road	Town of East Gwillimbury Road

E.4 CONSULTATION PROCESS

E.4.1 Study Organization

Exhibit E-8 provides an overview of the parties involved in the study and their interrelationship.

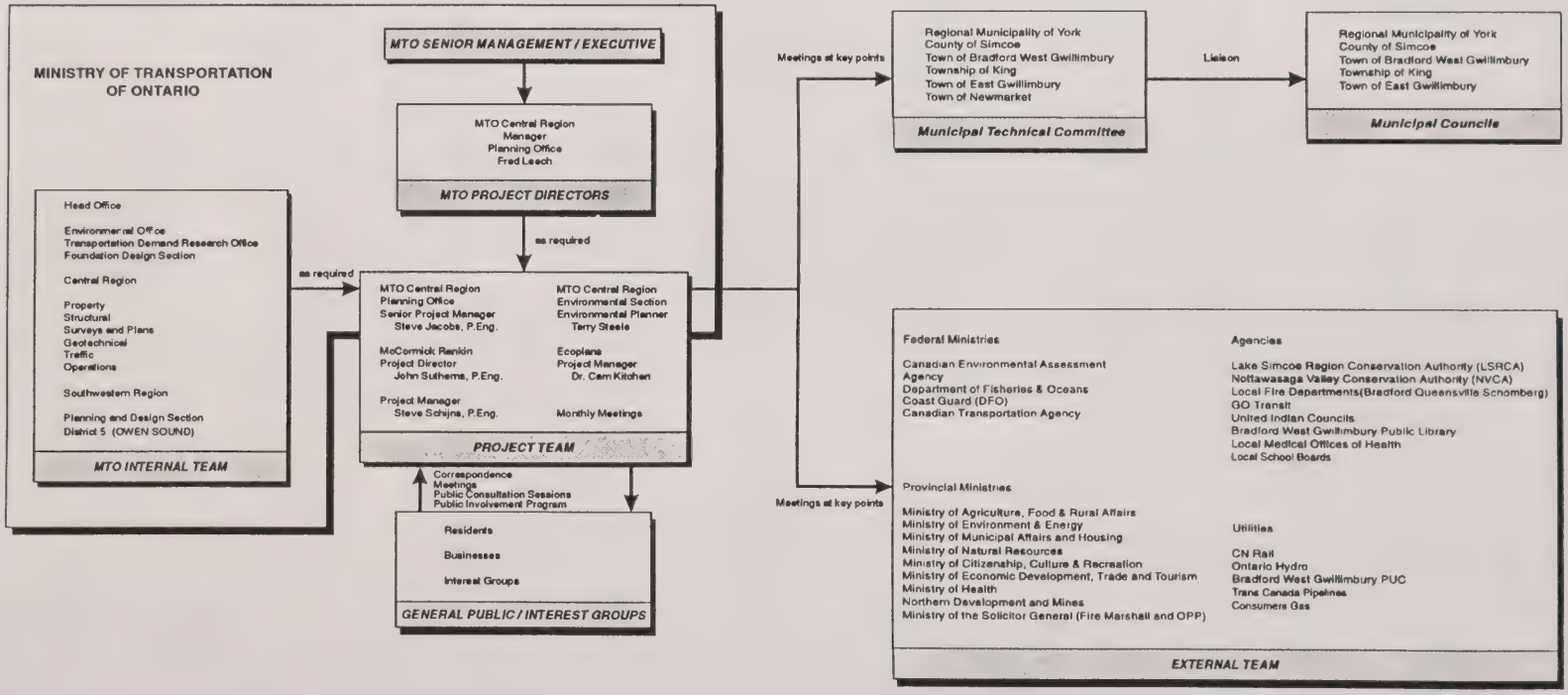
E.4.2 Consultation Plan

Consultation with the review Ministries and agencies, municipalities, elected representatives, landowners, special interest groups and the public has been a key component of all phases of this study. The consultation plan was established in 1993 in the EA Proposal, and has assisted the project team in:

- identifying relevant concerns of the various parties so that appropriate consideration could be given to these matters as decisions and commitments were made relative to the preferred planning solution or specific design proposals;
- identifying environmentally significant areas/issues;
- identifying alignment alternatives ;
- ensuring that appropriate mitigating measures are identified and considered to minimize potential adverse effects; and
- ensuring that any commitments to future work are clearly outlined and documented.

As a result of the consultation process there were many actions taken to address comments and issues/concerns. This included an economic impact study which assessed the potential effects of the Recommended Plan on businesses in Bradford (Appendix I). An overview of the actions taken to respond are included in Section 4.2.4 of the main report.

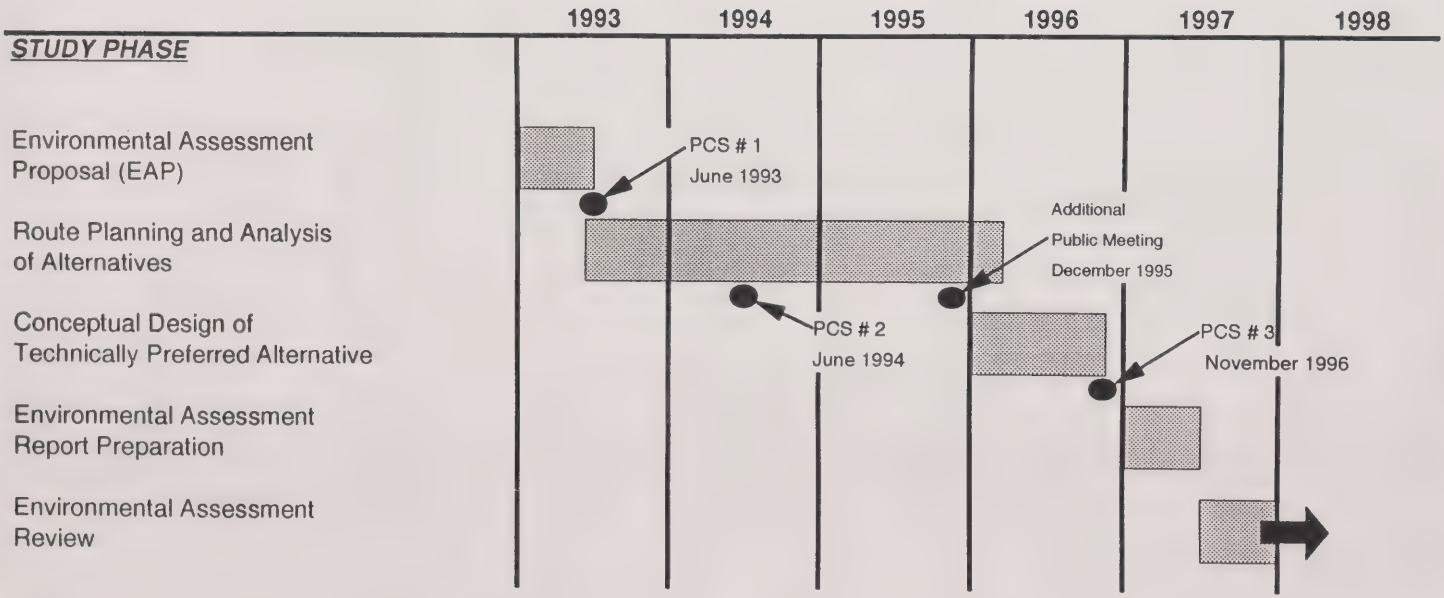
Exhibit E-9 summarizes the key events and milestones marking the consultation process between 1993 and 1997. An expansion of the process and results of the three rounds of public consultation is found in Appendix C. A summary of contacts made with all municipalities, government agencies, interest groups, and members of the public is included in Exhibit E-10.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY ORGANIZATION

EXHIBIT
E-8



PCS # 1 - June 1993
- Introduce the Study
- Present the Draft EAP
- Receive Input Regarding Issues / Concerns

PCS # 2 - June 1994
- Review of Revised EAP
- Identify Alternative Routes
- Identify Study Area Constraints
- Distribute Questionnaire
- Present the Proposed Evaluation Process

Additional Public Meeting - December 1995
- Discuss Comparison of Hwy. 9 / Green Lane / Newmarket vs. Bradford Corridors

PCS # 3 - November 1996
- Review the Analysis and Evaluation of Routes
- Present the Technically Preferred Route

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

PUBLIC CONSULATION PLAN

EXHIBIT
E-9

The Consultation Plan used a variety of mediums to ensure public awareness of the study and to provide opportunities at any point during the study for public input. Mediums included:

- Public Consultation Sessions (PCS)
- Infosource Hotline (a free local phone call for area residents to hear study information and to leave comments / questions for the Project Team)
- newspaper advertisements/articles
- TV news
- a mailing list for study notices
- comment sheets provided at PCSs
- faxes, letters, e-mails, phone calls
- individual meetings with property owners/residents
- individual response to most comments received

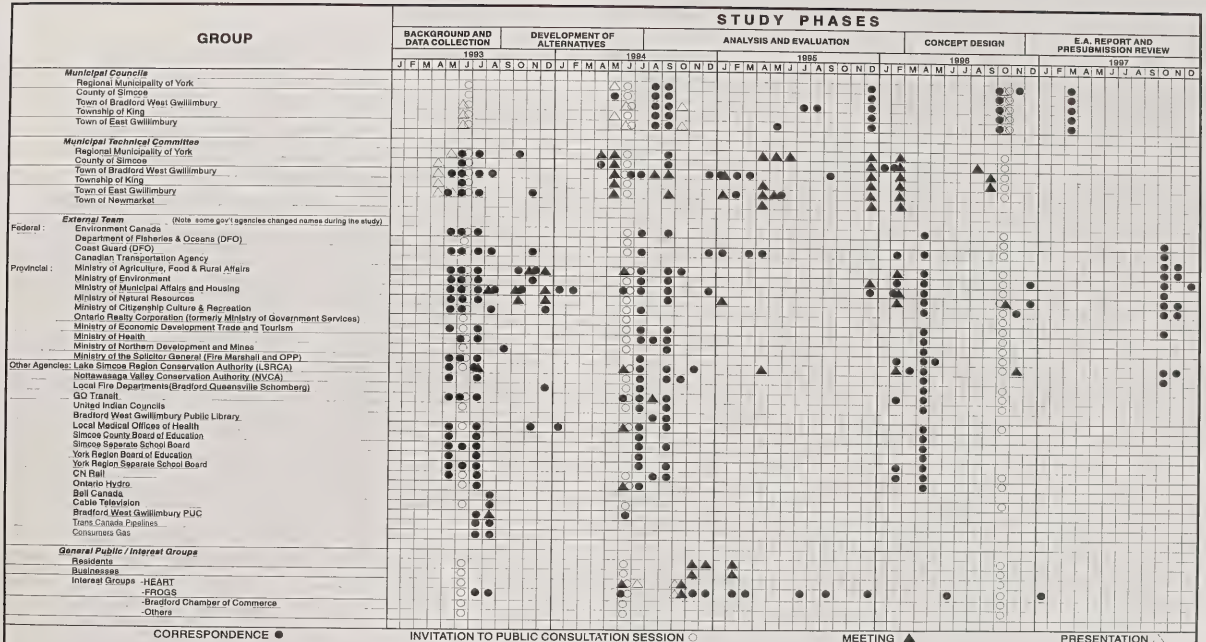
The most significant component of the consultation plan was the Public Consultation Session (PCS), a public forum which served to identify public concerns and issues relating to the study and to exchange ideas and information with members of the public. Three PCSs were arranged at key points in the study in order for the public to provide input on:

- the draft Environmental Assessment Proposal (EAP) (spring 1993)
- the identified route alternatives (mid-1994)
- the analysis and evaluation and the technically preferred route (late 1996)

A summary of the PCSs is provided in Section 2.2.2.1 of the main report. An expansion of these events, the information presented, and the comments received from the public is included in Appendix C of the main report.

In addition to the PCS component of the consultation plan, several public meetings were held to provide a forum for group discussion with study area residents on particular topics or study elements. A summary of these meetings is provided in Section 2.2.2.1; minutes are included in Appendix C.

The consultation process culminated with the preparation, distribution, and pre-submission review of a draft version of the Environmental Assessment Report. Comments and input provided by reviewing parties (External Team and Municipalities) through this pre-submission review step have been taken into account in the preparation of the final document and are documented in Section 4.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

SUMMARY OF CONTACTS

EXHIBIT
E-10

E.5 SUMMARY OF ENVIRONMENTAL EFFECTS, PROPOSED MITIGATION AND COMMITMENTS TO FURTHER WORK

Exhibit E-11 provides a summary of:

- environmentally significant issues;
- the concerned group or agency who identified the issue;
- the potential effects of the undertaking;
- the measures to be taken to mitigate the effects; and
- the commitments to further work and the agencies to be contacted in the future.

The detailed discussion for this summary is in Section 5.4 of the main report.

The steps which will be taken during the design phase of the project to address and finalize environmental commitments including the manner in which they will be dealt with are summarized in the next section and described in Section 5.3 of the main report.

E.6 STAKEHOLDER CONSULTATION DURING THE DESIGN PHASE

The MTO recognizes the sensitivities associated with the crossing of the major and minor watercourses in the study area and the need to minimize impacts through appropriate mitigation to ecological systems, local communities (including impacts from noise), heritage resources, agriculture, and the local economy. Therefore the MTO is committed to involving affected stakeholders in the design process to ensure that the 400-404 Link is designed and constructed in a way that is responsive to these stakeholders' interests. The following summarizes the proposed actions to be taken during the design phase to address design and environmental issues. There is no schedule or time frame established for the design or construction phases.

i) The Design Process

The design is usually carried out in two phases - preliminary design and detail design. These two phases have traditionally followed one after the other. However they may be combined as an evolving process to accelerate design and construction.

During this phase, initial mitigating measures and fishery habitat compensation plans (where required) will be developed in consultation with stakeholders. As well, the need for, and nature of follow-up monitoring will be determined in consultation with:

- Ontario Ministry of Natural Resources (MNR)
- Ontario Ministry of the Environment (MOE)
- Canada Department of Fisheries and Oceans (DFO)
- Canada Department of the Environment (DOE)
- Lake Simcoe Region Conservation Authority (LSRCA)

Again, ongoing consultation will ensure that, as the details of the design are refined, agency concerns continue to be addressed.

ii) The Canadian Environmental Assessment Act

The Canadian Environmental Assessment Act (CEAA) requires that a CEAA approval be obtained for those projects requiring federal lands, federal funding, or specified federal approvals. The Highway 400-404 Extension Link project is expected to trigger CEAA because of three types of federal approvals which include:

- Navigable Waters Protection Act (Canadian Coast Guard) - for the two crossings of the Holland River
- An Order to Construct (Canadian Transportation Agency) - for the crossing of the CN-Newmarket Subdivision if agreement cannot be reached with CN; and
- Fisheries Act (Department of Fisheries and Oceans) - for the two crossings of the Holland River

Where required, these applications will be accompanied by suitable environmental and design reports that provide the necessary environmental information to conduct a screening under the CEAA.

iii) Process For Addressing New Concerns

The Ministry of Transportation (MTO), in submitting this Environmental Assessment to the Ministry of Environment and Energy, has attempted to provide an appropriate level of detail about both the undertaking itself and the anticipated net environmental impacts. The MTO is committed to addressing the environmental concerns resulting from this undertaking whether identified in the Environmental Assessment Report or during the detail design phase prior to construction. The MTO will screen all component projects of this undertaking during their detail design for new concerns. **New concerns are defined to include only those concerns which have not already been identified in this Environmental Assessment Report**. If the MTO determines that a new concern is significant , then the Ministry will conduct the detail design for the affected project component of the undertaking under the Provincial Highways Class Environmental process.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
TRANSPORTATION				
Traffic Operating Speed (refer to Section 5.4.1.1)	Adequacy of facility to accommodate normal vehicle operating speeds	MTO	There are no segments of the route which fall below 140 km/h design speed. The direct ramps at the freeway-to-freeway interchanges use a 100 km/h design speed, thereby allowing smooth freeflow movement between facilities.	None
Traffic Volume (refer to Section 5.4.1.2)	Adequacy of facility to accommodate future travel demand	MTO	The 400-404 Link will accommodate up to 4,000 - 4,500 vehicles per hour per direction; on a daily basis, capacity is in the 70,000 - 100,000 range. There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, peak recreational traffic demand, and diverted traffic from congested alternate routes.	None.
Traffic Operations (refer to Section 5.4.1.3)	Provide for adequate Level of Service for vehicular operations	MTO	The 400-404 Link is designed to provide a high standard of operational quality and safety to its users. The road profile grade has been limited to 3% and an auxiliary (truck climbing) lanes have been included in the concept design. By attracting long distance and heavy truck traffic away from the municipal road network, traffic operations along those roads will be improved. Specifically, Queensville Sideroad, County Road 4 (former Highway 11), Holland Street, and Highway 88 will be relieved of a significant portion of through traffic, thereby reducing demand and improving Level of Service at signalized and unsignalized intersections along their length.	All at-grade intersections at the interchange ramp terminals will be signal-controlled if justified according to the provisions of the Ontario Manual of Uniform Traffic Control Devices.
Safety (refer to Section 5.4.1.4)	Design for safe operation of the facility	MTO, OPP	The 400-404 Link will feature all standard safety provisions of the day for high-speed provincial freeways. The construction of the Link will result in a net reduction in vehicle accidents throughout the study area.	The design features related to road safety (pier protection, barriers, illumination, etc.) will reflect fully the Provincial Design Standards and Policies in effect at the time of design. Use of the roadway by bicyclists, pedestrians, and slow-moving farm vehicles will be prohibited. Emergency routes will be maintained through retention of the existing road network, and improved by the presence of a new link in the road network.
Efficiency (refer to Section 5.4.1.5)	Minimize out-of-way travel	MTO, general public	The Link will reduce out-of-way travel in the study area by providing a readily-accessed new link in the roadway network in a location where no direct east-west routes now exist. Travel on the new route will be high-speed non-stop steady flow and the efficiency of some existing roads will also improve with the diversion of traffic to the new route.	None

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Network Aspects (refer to Section 5.4.1.6)	Provide for roadway continuity	MTO	The 400-404 Link will provide a consistent facility type for long distance traffic in the south Lake Simcoe area, and will bisect the gap for east-west travel in the provincial highway network between Highway 400 and the proposed extension of Highway 404. The existing municipal roads in the area of the link will be linked to the new route at key points, and all existing crossing roads will remain open.	None
Financial (refer to Section 5.4.1.7)	Affordability of roadway construction cost	general public/MTO	The project will generate jobs during construction and travel time savings and other economic benefits for many years.	A decision to proceed with construction will be made by the Minister of Transportation in light of the funds available and priority of other provincial projects at that time. Construction can be staged so as to spread the investment over several years.
Construction (refer to Section 5.4.1.8)	Constructability of the facility, particularly across the Holland River valley	MTO, general public	The Link crossings of the lowlands surrounding both branches of the Holland River will see a mixture of structure and fill. Structure footings will be on deep piled foundations.	Detailed subsurface investigation along the route will be undertaken as part of the design phase, and embankment design and structural features will reflect the nature and composition of subsurface materials.
Staging (refer to Section 5.4.1.9)	Ability to create early benefits, meet immediate needs, and defer expenditure through staged construction	MTO, municipalities, general public	Many of the goals of the project would be achieved with an initial two lane roadway, and two-stage implementation would allow deferral of a significant proportion of the overall project cost. Conversely, if funding is not available for partial early implementation the result may be that when the project is finally constructed the travel demand at that time would warrant provision of the full four lane freeway and it would be built in a single stage as such.	Within an overall stage, interim completion of sub-sections may be possible, allowing the early opening of completed segments.
NATURAL ENVIRONMENT				
General Commitment	High priority given to environmental work as design proceeds		Minimal long term environmental impact of the Link through design and mitigation.	At the outset of the design phase, the proponent will meet with MNR, LSRCA, and DFO staff to discuss concerns, review and update their workplan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase. This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking. Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of these activities upon adjacent lands or watercourses, and the mitigation that will be employed to minimize the impacts. The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Natural Environment General Commitment (cont'd)				Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with MNR, LSRCA, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.

Surface Water Systems (refer to Section 5.4.2.1)	Minimize potential adverse impacts to surface water systems (physical characteristics, water quality and quantity)	MTO, MNR, MOEE, DFO, LSRCA, interest groups, general public	Long-span bridges will carry the proposed 400-404 Link across both branches of the Holland River. Other stream crossings will use appropriately designed culverts.
			
			The continuity of the surface water system will be maintained.
				Where appropriate:
				• design bridges and culverts that:
				  • maintain the existing channel form or include a low flow channel where appropriate;
				  • do not impede fish movement;
				  • do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions;
				  • minimize erosion and flood risk upstream and downstream of structure;
				  • utilize open bottomed culverts in upwelling areas.
				• develop plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.

Fisheries and Aquatic Habitat (refer to Section 5.4.2.2)	Protect fish habitat during and following construction including no net loss of habitat	MTO, MNR, DFO, LSRCA, interest groups, general public	The 400-404 Link extends east-west and will cross several warmwater streams including two branches of the Holland River where there is the potential for a small loss of wetland area that may currently provide spawning habitat. Within the two affected watersheds (Holland River and Maskinonge River), a number of smaller streams and agricultural drains that provide or may provide habitat for migratory warmwater species and or resident baitfish populations will be affected. Key concerns during construction are the introduction of sediment, habitat disturbance and alteration of the stream banks and bed during structure placement.	Where appropriate: • develop a fish management plan that maintains or enhances fish habitat • plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance; • plans that provide for watercourse realignments in dry;

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Fisheries and Aquatic Habitat (cont'd)				• timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods; and • plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.
Vegetation (refer to Section 5.4.2.3)	Removal and/or disturbance of vegetation and flora, along with fragmentation of large woodland blocks	MTO, MNR, interest groups, general public	Where possible, larger blocks of vegetation were avoided. However, 22.1 ha of higher quality woodlands will be removed. The total area of the Holland Marsh ESA affected by the proposed facility is 17.2 ha. The impact will not affect the status of the ESA. The Recommended Plan was routed, where possible, to areas of existing openings, areas of previous disturbance, or along the edge of vegetative blocks.	Where appropriate: • edge management plans for areas of new disturbance to protect remaining trees and re-establish edge; • salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance; • relocate rare, threatened or endangered plant species; • minimize disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas; and • maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat. • vegetation removal and protection of residual vegetation should be completed in accordance with Ontario Provincial Standard Specifications;

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Wetlands (refer to Section 5.4.2.4)	Crossing of the Holland Marsh Wetland Complex	MTO, MNR, LSRCA, MOEE, interest groups, general public	9.5 ha of Provincially Significant Wetland (PSW) will be crossed by the right-of-way; the remaining 8.9 ha is composed of marsh and swamp community types. The above figures refer to the total land area taken by the 100 m right-of-way to be designated for the route. In fact, the direct physical impacts will be significantly less and will be limited to the construction of widely separated bridge piers. Fens are the most sensitive land use types along the route, being dependent on the shallow lateral movement of groundwater. Only a small area of degraded fen is potentially affected.	Maintaining of the volume and pattern of water flow through the wetland (both surface water and groundwater) and the post-construction restoration of areas affected by construction related activities will be a focal point of the mitigation efforts. Commitments include, where appropriate: • develop restoration plans for areas of wetland temporarily disturbed by construction • installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians; • delineation of areas to be protected with sediment fences to prevent intrusion during construction; • timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and Ontario Game and Fish Act (1980); • salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance; • minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established; and • retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland. The MTO has committed to construct the facility as an elevated pier structure through the PSW. Emphasis will be placed on minimizing backwater effects and maintaining groundwater flows and patterns, thereby minimizing longer term effects on the fen wetland type.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Wetlands (cont'd)				Monitoring of all activities in the wetland along with ongoing site review efforts with the responsible agencies will be key elements of the design and construction process. Where feasible, wetland substrates will be salvaged for use in stormwater management facilities (e.g. substrate and seed bank for wetland creation in SWM ponds). Where other wetlands are encountered, similar mitigative measures will be employed. Efforts will be made to ensure, by way of the road design, that surface water drainage and shallow groundwater patterns are not subjected to major alterations.
Wildlife (refer to Section 5.4.2.5)	Minimize wildlife habitat disturbance, minimize fragmentation of large habitat blocks and maintenance of wildlife corridors	MTO, MNR, interest groups, general public	The proposed 400-404 Link will remove 32.7 ha of significant wildlife habitat, potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered Hawk) currently nesting in proximity to the recommended plan, and potentially interrupt wildlife movement along some stream corridors and woodlots, particularly in the area between Highway 400 and Simcoe County Road 4 (Highway 11).	By using available openings skirting the large woodland blocks in the Holland River flood plain and using disturbed edge locations, habitat fragmentation in that area is minimized. The proposed long-span bridges across the Holland River branches will retain wildlife movement opportunities along the river banks. The drainage plan will minimize the ponding of salt-laden runoff, and decrease impacts on sensitive aquatic habitat for breeding amphibians and other species. To minimize road kills, measures will include a wide, grassed, open, median, fencing of the right-of-way, provision of good visibility for drivers, and the consideration of cautionary wildlife crossing signage. Commitments include, where appropriate: • design bridges and culverts that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors; • restrict clearing of trees immediately adjacent to or within significant breeding areas to non-critical periods; and • monitor wildlife movement patterns and potential areas of conflict.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Groundwater (refer to Section 5.4.2.6)	Potential well impacts and contamination of/interference with groundwater resources	MTO, local municipalities, property owners	24 domestic wells are potentially affected either directly (i.e. removal) or indirectly (i.e. potential interference) by the proposed Link. In the area of sandy soils associated with the Holland River, shallow perched groundwater system is susceptible to contamination and/or interference. The Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway.	• tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well travelled areas where soil compaction has occurred in areas that previously permitted infiltration; • backfilling of excavations that intercept existing ground water flow with porous granular material to maintain existing ground water linkage particularly at river crossings; • detailed stormwater management plans which address both quantity and quality; • a well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply; and • use of appropriate dewatering and spills avoidance management techniques.
Greenways and Open Space Linkages (refer to Section 5.4.2.7)	Minimize the disruption to existing greenways/natural corridors	MTO, MNR, York Region, general public	The Link is an east-west route traversing a landscape in which the main natural features are on a north-south axis particularly in the centre of the study area, namely, the two branches of the Holland River and the associated wetlands and upland forest. Where possible, the Link alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the Link crosses both branches of the Holland River and its associated wetlands it will be on a pier structure.	Mitigative efforts will be focused on the restoration of natural vegetation disturbed by construction-related activities, thereby ensuring the continuity of the natural vegetation within the central portion of the study area.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Soil (refer to Section 5.4.2.8)	Minimize the areas of high capability mineral soils (Class 1, 2, 3, 4) and agricultural organic (muck) soils removed	MTO, OMAFRA, agricultural property owners, general public	In the segments of the study area to the west of the Holland River basin and east of the ridge formation the soils are consistently high capability loam and silty clay loam (Class 1, 2, 3, 4) and there are no distinct areas of lower capability soils where an alternative alignment would have a lesser impact. The proposed Link will remove 190.37 ha of high capability mineral soils from potential agricultural use. Between the river branches the soils include poorly drained shallow sandy soil (Class 4) and organic soils, both with excessive water limitations. The underlying clay is evident within the plough layer in some locations indicating that the depth of the organic deposits is being depleted. The proposed Link alignment utilizes an area of previous disturbance (Hochreiter Road) thereby minimizing although not eliminating impact; 9.3 ha of organic (muck) soil are removed by the proposed Link.	There are no areas where lower capability soils provide a reasonable alternative route. The loss of higher capability soils is unavoidable. The area taken has thus been minimized.
SOCIAL ENVIRONMENT				
Aesthetics (refer to Section 5.4.3.1)	Minimize visual intrusion and maximize attractiveness of new roadway	MTO, area residents	The route avoids one of the most sensitive areas in terms of visual impact - the Scanlon Creek Conservation Area - and the woodlots adjacent to the route in the Holland River lowlands will screen most medium-to-long views of the embankment and long bridges. Future expansion of urban development north of 8th Line will likely serve to screen the view of the facility from most existing residences. The long view from the hillside residential area north of Bradford (Grandview Estates) can not be screened. The effect on downtown Bradford of the reduction of through traffic and heavy trucks from the main commercial arteries; this is a key element in the local HEART Committee's efforts to revitalize and beautify the downtown. Another viewing highlight will be presented to Link users on the approaches to the Holland River valley, as dramatic vistas open up to eastbound travellers as they approach County Road 4 and to westbound motorists as they crest the beach ridge west of Leslie Street.	In open rural territory the freeway will be visible; it is in such areas that landscaping within the right-of-way should be considered. The two river crossing structures will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans, and tapered piers; visual appeal to motorists and to those who may see the bridge from below will be a significant factor in selecting and detailing the bridge design.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Highway Construction Noise (refer to Section 5.4.3.2 and Appendix H)	Minimize impact of noise generated by the new highway on nearby residential areas	MTO, MOE municipalities, area residents	Approximately 49 of the 214 homes currently within 600 m of the proposed alignment will experience noise level increases greater than 5 dBA.	MTO policy indicates that where increases exceed 5 dBA: • investigate noise control measures within the right-of-way • if project cost is not significantly affected, introduce noise control measures within the right-of-way • noise control measures where introduced, should achieve a minimum of 5 dBA attenuation averaged over the first row of receivers (NSAs) Mitigation measures relating to noise and vibration will be documented in a Design and Construction Report. With regard to construction noise, at the design stage, the MTO will carry out the following commitments: • Noise sensitive areas will be identified. • Applicable municipal noise control by-laws will be identified. Where timing constraints, or any other municipal by-law may cause hardship to MTO, an exemption will be sought. • An initial complaint from the public will require verification by MTO that the general noise contro! measures agreed to are in effect; MTO will investigate all noise concerns, warn the contractor of any problems, and enforce its contract. • Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with MOEE sound level criteria for construction equipment contained in the MOEE Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Highway Construction Noise (cont'd)				• In selecting the appropriate construction noise control and mitigation measures, MTO will give consideration to the technical, administrative, and economic feasibility of the various alternatives. • Where pile driving or blasting may be necessary in noise sensitive areas monitoring will be determined an adopted by Ministry of Transportation policy pursuant to prevailing provincial legislation at the time of construction.
Community Effects (refer to Section 5.4.3.3)	Minimize the negative impact of the new road on homes, community features, and recreational areas/ practices	MTO, municipalities, interest groups, area residents, general public	Homes: By travelling mid-concession and utilizing available gaps in the developed countryside, the number of individual homes within the 15.3 km long Link right-of-way was kept to 6 (two each at Yonge Street, Bathurst Street and County Road 4). Community Features: The new route avoids entirely the area's community features such as schools, churches, cemeteries, parks and other public facilities. In improving access to Bradford and providing a new link across the Holland River valley, the facility will improve the attractiveness of existing facilities. Recreational Areas/Practices: The Link avoids the Scanlon Creek Conservation Area. The long-span high-level bridges across the two river branches will allow continuation of all water-based recreational activity such as boating, canoeing, fishing and birdwatching.	Where the bridge passes by Albert's Marina particular attention will need to be paid to mitigation of noise and visual intrusion on marina users in the design phase (e.g. location/ elimination of expansion joints, pier and substructure aesthetics, road surface drainage, noise deflectors, etc.). Similar consideration will need to be given to the facility design in the vicinity of the Silver Lakes Golf Course.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
ECONOMIC ENVIRONMENT				
Agriculture (refer to Section 5.4.4.1)	Preserve agricultural land and minimize negative impacts on agricultural operations	MTO, OMAFRA, agricultural property owners, general public	A total of 13 field crop and 3 livestock farming operations are affected by the proposed facility in the west section. A total of 7 specialty crop, 3 livestock and 5 field crop operations are directly affected by the proposed Link in the east and central sections. The total land area, currently in active agricultural production, directly affected by the proposed facility is 84.4 ha in the western section and 69.9 ha in the east and central section totalling 154.3 ha.	To minimize the negative effects of the route on agricultural operations and avoid major severances, the alignment is located mid-concession where possible, or along existing lot lines.
Commercial/Industrial (refer to Section 5.4.4.2)	Enhancr commercial/ industrial sector while minimizing negative impact on local businesses, particularly downtown Bradford	MTO, municipalities, interest groups	By the time of Link construction it would have little net negative effect on the economic viability of the town, and would in fact support commercial/industrial growth through improved access to the provincial freeway system and reduced truck use of local streets. The route passes through two lots on Artesian Industrial Parkway currently occupied by commercial businesses; they could be relocated to undeveloped lots nearby. The link will also impact property occupied by parts of Albert's Marina and the Silver Lakes Golf Club on either side of the Holland River East Branch, but the functional and economic viability of both enterprises will remain.	Part of the freeway plan will include signage orienting traffic towards downtown Bradford where appropriate. Consultation with Albert's Marina and Silver Lakes Golf Club will be necessary during the design phase to minimize impacts to each business; some reconfiguration of the facilities within each property will be needed.
Property Waste and Contamination (refer to Section 5.4.4.4)	Avoidance of waste/contaminated sites	MTO	The Link alignment avoids the only known landfill site in the study area (north side of 8th Line, west of the CN Rail line). However, it is possible that landfill waste or other contamination may be discovered during subsequent design or construction phases.	Any waste material or contaminated soils encountered will be managed in accordance with the requirements of applicable legislation, such as the Environmental Protection Act, and with applicable guidelines such as the MOEE Guidelines for Use at Contaminated Sites in Ontario. Measures to ease the contaminant of accidental spills will be considered in the design of stormwater management facilities for the Link.
Aggregates (refer to Section 5.4.4.5)	Avoidance of taking aggregate deposits out of current or potential production	MTO	There are no significant aggregate deposits on or adjacent to the Link right-of-way. A significant quantity of imported fill will be required for the Link roadbed.	Construction of the Link will support aggregate production in nearby pits and quarries.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
CULTURAL ENVIRONMENT				
Archaeology (refer to Section 5.4.5.1)	Avoidance of known or potential sites of archaeological significance	MTO, MC_2CR, interest groups, general public	The route passes well to the north of the early 19th century steamboat landing and transshipment point. A significant prehistoric/early historic site was discovered partly within the proposed right-of-way. The potential exists for other undiscovered archaeological sites at the Holland River East Branch and elsewhere within the proposed freeway right-of-way.	Once the specific nature and extent of archaeological resources impacted by the highway are identified, appropriate mitigation measures will be developed in accordance with the MTO/MC_2CR guidelines.
Historical (refer to Section 5.4.5.2)	Minimize impact on significant historical elements of the built environment	MTO, MC_2CR, interest groups, property owners, general public	No significant historical buildings and features are directly affected (within the right-of-way). One historically significant home (near Simcoe County Road 4) is within 100 m of the route.	Mitigation of visual impact of the Link through landscaping and other options will be investigated where appropriate.
APPLIED ENVIRONMENTAL CONDITIONS				
Stormwater Management (refer to Section 5.4.6.1) .	Management of roadway runoff and stormwater so as to reduce impacts to the quality and quantity of surface and groundwaer	MTO, MNR, LSRCA	Stormwater runoff has the potential to severely impact the quality and quantity of surface and groundwater.	The objectives of the Plan will include: • When designing Stormwater Management Practices (SWMPs), consideration will be given to measures for reducing adverse environmental impacts to surface and groundwater. • Bridge runoff should be discharged to stormwater management facilities (preferably a pond or swale) prior to discharge to watercourses where this reasonably can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems.
Erosion and Sediment Control (refer to Section 5.4.6.2)	Protection of terrestrial and aquatic resources through limitation of soil erosion and sedimentation.	MTO, MNR, LSRCA	Soil erosion and sedimentation can potentially harm terrestrial and aquatic resources.	The identified right-of-way for the Link has been checked at locations of deep cut and fill to ensure that adequate property is shown to accommodate slope benching. Mitigation will include contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness;
Sustainable Development (refer to Section 5.4.6.3)	Avoidance of contributing to unsustainable development patterns.	MTO, general public	In supporting mobility of people and goods and in supporting the economic development of the study area (Bradford in particular), the Link may contribute to a reduction in dependence on long-distance commuting for residents of northern York Region as a significant proportion currently travel to jobs outside the area.	None.

1.0 OVERVIEW OF UNDERTAKING AND APPROVALS BEING SOUGHT

1.1 Summary Description of the Undertaking

1.1.1 Purpose of the Undertaking

The undertaking for which the Ministry of Transportation of Ontario (MTO) is seeking approval will be a freeway connecting Highway 400 in the Town of Bradford West Gwillimbury (County of Simcoe) to the proposed extension of Highway 404 in the Town of East Gwillimbury (Regional Municipality of York). It will be located north of and parallel to Highway 88 in Bradford West Gwillimbury and Queensville Sideroad (York Road (YR) 77) in East Gwillimbury. The route traverses a small segment of the Township of King in York Region. The undertaking (Recommended Plan) is shown in Exhibit 1-1.

The purpose of the proposed roadway is to resolve several outstanding transportation problems and to address significant opportunities in the northern York / southern Simcoe area. The Recommended Plan will:

- together with the extension of Highway 404 from its current terminus at Davis Drive northerly to at least the 400 - 404 Link, significantly reduce the traffic operational and distribution problems currently experienced as a result of the incomplete and fragmented nature of the provincial highway system in the study area;

- by crossing the barrier to east-west travel formed by the Holland River, reduce the occurrence of inefficient out-of-way travel and the consequential waste of fuel, time, and money;

- contribute significantly to the ability of the area transportation system to accommodate future travel demand needs, particularly that generated by planned growth in population and employment within York and Simcoe;

- provide land use and transportation planning authorities in the affected area with a clearly-defined roadway plan and an associated property reserve, as input to their critical long-term planning decision-making process;

- relieve key municipal roads of long distance "provincial" inter-regional commuter and recreational traffic, thereby easing congestion and its associated negative impacts on existing communities; and

- by identifying and reserving the appropriate property right-of-way now (prior to urban expansion occurring so as to affect or eliminate the feasibility of the corridor), be able to be implemented in a flexible, staged manner and with a minimum of disruption to the surrounding community.

1.1.2 Roadway Design

The proposed freeway linking Highway 400 and the proposed extension of Highway 404 will be a 4-lane controlled access facility for its entire 16.2 km length. The freeway cross section will be rural (shoulders - no curbs) within a basic 100 m right-of-way and have a design speed of 120 km/h. The cross section will incorporate a 30 m wide grassed median, with the exception of the two Holland River crossings east of Bradford where the median width will narrow to 8 m with a concrete barrier.

The continuity of all existing crossing roads will be maintained and each will ultimately be grade-separated with the freeway. There will be interchanges at 5 locations along the proposed route:

- Highway 400 (provincial freeway);
- Simcoe County Road 4 (former Highway 11);
- York Regional Road 38 (Bathurst Street);
- York Regional Road 12 (Leslie Street), partial interchange; and
- proposed Highway 404 (provincial freeway)

Other grade-separated crossings include the following:

• 10 Sideroad (Middletown Road)	Town of Bradford West Gwillimbury Road
• Artesian Industrial Parkway	Town of Bradford West Gwillimbury Road
• CN Rail	CN North America - Newmarket Subdivision
• Yonge Street	Town of East Gwillimbury Road
• 2nd Concession Road	Town of East Gwillimbury Road

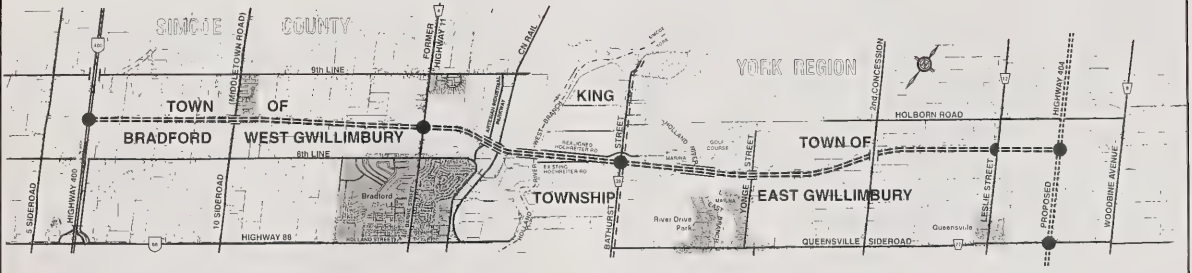
1.1.3 The Net Environmental Effects of the Undertaking

The following summarizes the Recommended Plan in terms of net environmental effects. The alignment and proposed mitigating measures have been developed to a conceptual level of detail. Specific mitigation measures will be developed in more detail during the future design phases of the project.

1.1.3.1 Transportation

Traffic Operating Speed (refer to Section 5.4.1.1)
The 400-404 Link is planned as a multi-lane freeway with similar design objectives as other 400-series provincial freeways, for which the standard posted speed limit is 100 km/h. In recognition of safety and with consideration given to the potential for speed limits to be revised over the decades of Link operation, and given the opportunity to design to a high standard due to the relatively gentle topography along the route, there are no segments of the route which fall below 140 km/h design speed. This produces gradual horizontal and vertical curves in the alignment at only a minor incremental difference in cost from the typical 120 km/h design speed used in earlier freeways.

The direct ramps at the freeway-to-freeway interchanges use a 100 km/h design speed, thereby allowing smooth freeflow movement between facilities. Where constraints dictate use of inner loop ramps, large radii have been applied.



RECOMMENDED ROUTE FOR PROPOSED 400-404 LINK

PROPOSED 404 EXTENSION

FULL INTERCHANGE

PARTIAL INTERCHANGE

RESIDENTIAL AREAS

NOTE: HWY. 88 WILL BE BECOME A SIMCOE COUNTY ROAD ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

RECOMMENDED PLAN

EXHIBIT 1-1

SCALE 1:50,000

Traffic Volume (refer to Section 5.4.1.2)

As a typical four lane rural freeway, the Recommended Plan can accommodate up to 4,000 - 4,500 vehicles per hour per direction; on a daily basis, capacity is in the 70,000 - 100,000 range. The forecast demand volumes for the facility are well within this range for the foreseeable future (see Section 3.1.2.2 (d)). There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, peak recreational traffic demand, and diverted traffic from congested alternate routes.

Traffic Operations (refer to Section 5.4.1.3)

The Recommended Plan is designed to provide a high standard of operational quality and safety to its users. In the two locations where lengthy upgrades must be traversed (eastbound between 2nd Concession and Leslie Street and westbound near County Road 4) the road profile grade has been limited to 3% and an auxiliary (truck climbing) lane has been included in the concept design in order to minimize the effects of slow-moving vehicles on traffic flow.

By attracting long distance and heavy truck traffic away from the municipal road network, traffic operations along those roads will be improved. Specifically, Queensville Sideroad, County Road 4 (former Highway 11), Holland Street, and Highway 88 will be relieved of a significant portion of through traffic, thereby reducing demand and improving Level of Service at signalized and unsignalized intersections along their length.

Safety (refer to Section 5.4.1.4)

The Recommended Plan will feature all standard safety provisions of the day for high-speed provincial freeways. Reference may be made to Sections 5.4.1.1 and 5.4.1.3 in that regard. The right-of-way will be fenced and use of the roadway by bicyclists, pedestrians, and slow-moving farm vehicles will be prohibited.

The construction of the Link will improve traffic operations on alternate roadways (see Section 5.4.1.3) which, when combined with the lower accident rate typically associated with a freeway, will result in a net reduction in vehicle accidents throughout the study area.

Efficiency (refer to Section 5.4.1.5)

The analysis of alternative corridors and routes demonstrated that the proposed Link is the most efficient of all reasonable alternatives, and will reduce out-of-way travel in the study area by providing a readily-accessed new link in the roadway network in a location where no direct east-west routes now exist. Travel on the new route will be high-speed non-stop steady flow (the most efficient travel pattern) and the efficiency of some existing roads will also improve with the diversion of traffic to the new route and consequent reduction in congestion (see Section 5.4.1.3).

Network Aspects (refer to Section 5.4.1.6)

As a freeway which links two other freeways, the Recommended Plan will provide a consistent facility type for long distance traffic in the south Lake Simcoe area. It will bridge the gap for east-west travel in the provincial highway network between Highway 400 and the proposed extension of Highway 404 north from Highway 407 to Lake Simcoe. The existing partial grid of municipal roads in the area of the proposed alignment will be linked to the new route at key points, and all existing crossing roads will remain open.

Financial (refer to Section 5.4.1.7)

As an infrastructure project which will be amortized over many years and which will generate jobs during construction; travel time savings; and other economic benefits for many years thereafter, the 400-404 Link represents a sound economic investment. Construction can be carried out in stages so as to spread the investment over several years. A decision to proceed with construction will be made by the Minister of Transportation in light of the funds available and priority of other provincial projects at that time.

Construction (refer to Section 5.4.1.8)

The Recommended Plan's crossing of the lowlands surrounding both branches of the Holland River (from Artesian Industrial Parkway to east of 2nd Concession) will comprise a combination of structure and fill. Structure footings will be on deep piled foundations.

At the proposed Highway 400 interchange, Highway 400 will stay in operation throughout the period of construction of the 400-404 Link.

Staging (refer to Section 5.4.1.9)

Among project supporters, there is considerable interest in advancing the construction timetable to generate an effective facility at as early a stage as possible. Many of the goals of the project would be achieved with an initial two lane roadway, and two-stage implementation would allow deferral of a significant proportion of the overall project cost. Conversely, if funding is not available for partial early implementation the result may be that when the project is finally constructed the travel demand at that time would warrant provision of the full four lane freeway and it would be built in a single stage as such.

Within an overall stage, interim completion of sub-sections may be possible, allowing the early opening of completed segments.

1.1.3.2 Natural Environment

Surface Water Systems (refer to Section 5.4.2.1 and Appendix G)

Long-span bridges are planned to carry the proposed 400-404 Link across both branches of the Holland River. Other stream crossings will use appropriately designed culverts. The biological

aspect of surface water resources are discussed under Sections 5.4.2.2 (Fisheries and Aquatic Habitat) and 5.4.2.4 (Wetlands). Stormwater Management is discussed in more detail in Section 5.4.6.1.

Fisheries and Aquatic Habitat (refer to Section 5.4.2.2 and Appendix G)

The Recommended Plan extends east-west and will cross several warmwater streams including two branches of the Holland River where there is the potential for a small loss of wetland area that may currently provide spawning habitat. The majority of drainage channels drain south to north. Within the two affected watersheds (Holland River and Maskinonge River), a number of smaller streams and agricultural drains that provide or may provide habitat for migratory warmwater species and or resident baitfish populations will be affected. Key concerns during construction are the introduction of sediment, habitat disturbance and alteration of the stream banks and bed during structure placement.

Vegetation (refer to Section 5.4.2.3 and Appendix G)

Along the length of the Recommended Plan some impacts on natural vegetation was unavoidable. In several cases, avoiding a woodland would generate greater impact on agriculture through severances. Also several of the areas affected are early successional systems and were not evaluated as being significant in terms of flora or wildlife habitat.

The major area of concern for natural vegetation was the central section of the Recommended Plan where major vegetation blocks are found (both upland and wetland types). Fifteen natural heritage features were identified along the Recommended Plan, eleven of which contain natural vegetation ranging from early successional shrub thicket/old field system to submature to mature woodlands. Only two areas of natural vegetation will be completely removed (two small remnant deciduous forest units approximately 1 ha in total area). An important element of the process to select the Recommended Plan was to minimize impacts on large blocks of natural vegetation (both upland and lowland) and, consequently, to minimize impacts on the wildlife habitat associated with these areas.

Where possible, these larger blocks of vegetation were avoided. However, over the approximately 16.2 km route of the recommended plan, some impacts were unavoidable. Specifically, 22.1 ha of higher quality woodlands will be removed. The boundary of the Holland Marsh Environmentally Significant Area (ESA A16, C1 - refer to Exhibit 4-2 for location) overlaps areas measured in various sections of the evaluation (i.e. organic soils, significant vegetation communities, wetland, wildlife habitat). The total area of ESA affected by the proposed facility is 17.2 ha.

Wetlands (refer to Section 5.4.2.4 and Appendix G)

Upon the initiation of the present study, the key environmental concern centred on the potential impacts of a new crossing of the Holland Marsh, which is a Provincially Significant Wetland Complex. In the route generation stage of the study, it was determined that it was not possible to avoid all impacts therefore, discussions with MTO/MNR scoped the consideration of alternatives to those that:

- cross only narrow sections of the Holland Marsh;
- utilize portions of the designated Holland Marsh that have been previously disturbed; and,
- use an elevated structure on piers rather than earth fill embankments to cross the designated wetland.

The Holland Marsh Wetland Complex extends south along both branches of the Holland River throughout the study area. As a result, it was not possible to establish a routing alternative that did not affect the wetland on the approaches to the two river crossings. The task became one of minimizing the area of wetland affected and the loss of function in the area of impact. The three principles noted above were adhered to during the evaluation process.

Approximately 9.5 hectares of the Holland Marsh Wetland Complex will be crossed by the Recommended Plan. The greatest effect is on the west bank (7.5 ha) where the route crosses three wetland types: shrub thicket (disturbed), tree swamp and marsh. The marsh area contains small areas of degraded fen. Fens and bogs are least common wetland types locally and sensitive to disturbance. Approximately 0.6 ha of degraded fen will be affected by the Recommended Plan. An undisturbed high quality fen area is avoided at the east Holland River crossing. The majority of wetland affected (8.9 ha) is composed of swamp and marsh community types. The main body (core) of the wetland to the north of the Recommended Plan will be unaffected.

The above area figures are based on a 100 m wide right-of-way designated for the route. As the facility will be on a piered structure, the area impacts will be less than that stated above. The long term impact will be significantly less and limited to widely spaced bridge piers.

Wildlife (refer to Section 5.4.2.5 and Appendix G)

While minimizing the impacts on wildlife habitat and movement was a key factor in the selection of the preferred route, the vegetation patterns in the area are such that some impacts are unavoidable. The Recommended Plan will remove 32.7 ha of significant wildlife habitat, potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered Hawk) currently nesting in proximity to the proposed alignment, and impede wildlife movement along stream corridors and woodlots, particularly in the area between Highway 400 and Simcoe County Road 4 (Highway 11).

Groundwater (refer to Section 5.4.2.5 and Appendix G)

Rural homes and businesses throughout the study area all currently utilize private wells; 24 domestic wells are potentially affected either directly (i.e. removal) or indirectly (i.e. potential interference) by the proposed route. In the area of sandy soils associated with the Holland River, shallow perched groundwater system is susceptible to contamination and/or interference.

The Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway. The municipal well is fed by a deep aquifer well below the depth of potential impacts associated with construction of the proposed Link.

Greenways and Open Space Linkages (refer to Section 5.4.2.6 and Appendix G)

The Recommended Plan, is an east-west route traversing a landscape in which the main natural features are on a north-south axis in the centre of the study area, namely, the two branches of the Holland River and the associated wetlands and upland forest. In this area, the issue is related as much to the fragmentation of large natural areas as it is to the disruption of natural corridors. The discussion presented for vegetation (Section 5.4.2.3), wetlands (Section 5.4.2.4) and wildlife (Section 5.4.2.5) is also relevant here.

Where possible, the proposed alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the route crosses both branches of the Holland River and its associated wetlands it will be on a pier structure.

Soil (refer to Section 5.4.2.7 and Appendix G)

In the segments of the study area to the west of the Holland River basin and east of the ridge formation the soils are consistently high capability loam and silty clay loam (Class 1, 2, 3, 4) and there are no distinct areas of lower capability soils where an alternative alignment would have a lesser impact. Current policies (Ministry of Municipal Affairs and Housing 1996, 1997) have shifted the emphasis to Class 1,2 and 3 (i.e. excluding Class 4) as prime agricultural lands, however, to maintain consistency throughout the evaluation process, Class 4 has remained a component of the definition of high capability lands. The proposed Link will remove 190.37 ha of high capability mineral soils from potential agricultural use.

Between the river branches the soils include poorly drained shallow sandy soil (Class 4) and organic soils, both with excessive water limitations. The underlying clay is evident within the plough layer in some locations indicating that the depth of the organic deposits is being depleted. The proposed Link alignment utilizes an area of previous disturbance (Hochreiter Road) thereby minimizing although not eliminating impact; 9.3 ha of organic (muck) soil are removed by the proposed Link.

1.1.3.3 Social Environment

Aesthetics (refer to Section 5.4.3.1)

The east-west freeway will introduce a new element to the study area landscape and as such parts of the route will be highly visible to existing and future residents, recreational users, and motorists. The route avoids one of the most sensitive areas in terms of visual impact - the Scanlon Creek Conservation Area - and the woodlots adjacent to the route in the Holland River lowlands will screen most medium-to-long views of the embankment and long bridges. In open rural territory such as that

east of Yonge Street to the glacial shoreline, the freeway will be visible; it is in such areas that landscaping within the right-of-way should be considered.

As the route passes north of Bradford, it will be on embankment and exposed to a view from the south, but it is likely that future expansion of urban development north of 8th Line will serve to screen the view of the facility from most existing residences. The long view from the hillside residential area north of Bradford (Grandview Estates) can not be screened, but the freeway would be viewed as one element in the larger picture.

The two river crossing structures will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans, and tapered piers; visual appeal to motorists and to those who may see the bridge from below will be a significant factor in selecting and detailing the bridge design.

An aesthetic benefit related to the route is the effect on downtown Bradford of the reduction of through traffic and heavy trucks from the main commercial arteries; this is a key element in the local HEART (Heritage, Environment, Agriculture, Recreation, Tourism) Committee's efforts to revitalize and beautify the downtown.

Another viewing highlight will be presented to 400-404 Link users on the approaches to the Holland River valley, as dramatic vistas open up to eastbound travellers as they approach County Road 4 and to westbound motorists as they crest the beach ridge west of Leslie Street.

Highway and Construction Noise (refer to Section 5.4.3.2 and Appendix H)

Approximately 49 of the 214 homes currently within 600 m of the proposed alignment will experience noise level increases greater than 5 dBA. An increase in noise levels greater than 5 dBA generally requires that noise mitigation be considered. Future construction activities will have the potential to result in temporary noise level increases (particularly in areas previously described as noise sensitive).

Community Effects (refer to Section 5.4.3.3)

Homes: By travelling mid-concession and utilizing available gaps in the developed countryside, the number of individual homes within the 16.2 km long the proposed right-of-way was kept to 6 (two each at Yonge Street, Bathurst Street and County Road 4). The proximity-related effects of noise and visual intrusion for those homes near, but not within, the right-of-way are discussed in Sections 5.4.3.1 and 5.4.3.2. The property acquisition process is outlined in Section 5.2.7.

Community Features: The new route avoids entirely the area's community features such as schools, churches, cemeteries, parks and other public facilities. In improving access to Bradford and providing a new link across the Holland River valley, the facility will improve the attractiveness of existing facilities.

Recreational Areas/Practices: Existing recreational features are concentrated in the Holland River valley. The proposed Link alignment responds to a significant community concern by avoiding the

Scanlon Creek Conservation Area. The long-span high-level bridges across the two river branches will allow continuation of all water-based recreational activity such as boating, canoeing, fishing and birdwatching.

1.1.3.4 Economic Environment

Agriculture (refer to Section 5.4.4.1 and Appendix G)

The western section of the study area is dominated by field crop and mixed farming operations. A total of 13 field crop and 3 livestock farming operations are affected by the proposed facility.

The central section (between the Holland River branches) is dominated by vegetable (specialty crop) production. East of the Holland River East Branch is an extensive area of turf production, also a specialty crop type, occupying an area of flat sandy soils that extends to a ridge formation east of 2nd Concession Road. East of the ridge, field crop and mixing farming practices again dominate the landscape. A total of 7 specialty crop, 3 livestock and 5 field crop operations are directly affected by the proposed Link in the east and central sections.

The total land area, currently in active agricultural production,directly impacted by the proposed facility is 84.4 ha in the western section and 69.9 ha in the east and central section totalling 154.3 ha.

To minimize the negative effects of the route on agricultural operations and avoid major severances, the alignment is located mid-concession where possible, or along existing lot lines. The way in which lands were originally surveyed in Simcoe county and York Region differ and thus, east of the west Holland River it was not possible to avoid all severance situations. Where impacts are evident, efforts were directed to maintaining access and continued viability of the farming operations in their present locations.

Commercial/Industrial (refer to Section 5.4.4.2)

An economic impact study was undertaken (see Appendix I) which indicated that by the time of Link construction it would have little net negative effect on the economic viability of the town, and would in fact support commercial/industrial growth through improved access to the provincial freeway system and reduced truck use of local streets. The Bradford business sector was found, through survey, to be locally-oriented and not dependent on tourist or through traffic. Part of the freeway plan will include signage orienting traffic towards downtown Bradford.

The route passes through two lots on Artesian Industrial Parkway currently occupied by commercial businesses; they could be relocated to undeveloped lots nearby. The Recommended Plan will also impact property occupied by parts of Albert's Marina and the Silver Lakes Golf Club on either side of the Holland River East Branch, but the functional and economic viability of both enterprises will remain; some reconfiguration of the facilities within each property will be needed.

Special Land Use Strategies (refer to Section 5.4.4.3)

Four of the five municipalities directly affected by the Recommended Plan have updated or are in the process of updating their Official Plans over the course of the Link study. In each case - York Region, Simcoe County, Town of Bradford West Gwillimbury, and the Town of East Gwillimbury - the future presence of the Link is noted and reflected in the transportation system capacity and related land use planning strategies. King Township's Official Plan has not been updated and does not address the Link, however only a small section of King between the Holland River and Bathurst Street is crossed, and municipal plans must be in conformity with upper tier plans (in this case, York Region's, which does include the Link at a conceptual level).

The Link concept plan respects provincial policies concerning wetland crossings and avoids the Oak Ridges Moraine area of provincial interest.

Property Waste and Contamination (refer to Section 5.4.4.4)

The proposed alignment avoids the only known landfill site in the study area (north side of 8th Line, west of the CN Rail line). However, it is possible that landfill waste or other contamination may be discovered during subsequent design or construction phases. Any waste material or contaminated soils encountered will be managed in accordance with the requirements of applicable legislation, such as the Environmental Protection Act, and with applicable guidelines such as the MOE Guidelines for Use at Contaminated Sites in Ontario.

Aggregates (refer to Section 5.4.4.5)

There are no significant aggregate deposits on or adjacent to the proposed right-of-way. Because of the significant quantity of imported fill which will be required for the Link roadbed, construction of the Link will support aggregate production in nearby pits and quarries.

1.1.3.5 Cultural Environment

Archaeology (refer to Section 5.4.5.1 and Appendix J)

The Recommended Plan, of necessity, traverses several north-south corridors of archaeological potential (e.g. Holland River East Branch, glacial lake shorelines) but there is only one known archaeological site within the right-of-way. Archival research in the area between the Holland River East Branch and Yonge Street has revealed that the route passes well to the north of the early 19th century steamboat landing and transshipment point, but archaeological fieldwork at this location has discovered a significant prehistoric/early historic site partly within the proposed right-of-way. The potential exists for other undiscovered archaeological sites at the Holland River East Branch and elsewhere within the proposed freeway right-of-way.

Historical (refer to Section 5.4.5.2 and Appendix J)

There are no significant historical buildings and features directly affected (within the proposed right-of-way).

Only one historically significant home (near Simcoe County Road 4) is within close proximity (less than 100 m) to the 16.2 km long new route, and a change in its context from the current agricultural setting will occur either with or without the freeway (the surrounding properties have been held for several years by development companies in anticipation of future Bradford expansion).

1.2 Environmental Assessment Approvals Being Sought

As noted in the previous section, the undertaking for which approvals are being sought is a 16.2 km rural 4-lane controlled access freeway located in the County of Simcoe and Regional Municipality of York. The freeway, connecting Highway 400 in Bradford West Gwillimbury to the proposed extension of Highway 404 in East Gwillimbury extends north of, and parallel to Highway 88 in Bradford West Gwillimbury and Queensville Sideroad (York Road (YR) 77) in East Gwillimbury.

This report documents the Environmental Assessment (EA) process followed per the **Environmental Assessment Act, RSO 1990**. The Act was amended in 1997 and incorporated a transition provision for those submissions made by the end of 1997 to be processed under the rules of the earlier Act. Having completed the EA study prior to the end of 1997, the MTO is submitting the current 400 - 404 Link EA Report under the transition provisions of the 1997 Act. As such, MTO has requested to have Part II of the previous EA Act, and the provisions of Part II of the new Act with respect to mediation, if these are required, and the Section 12.2 activities permitted before approval, to apply to this EA.

This submission includes the following:

- purpose of the undertaking (Section 1.1.1)
- the environmental assessment process followed (Section 2.1);
- statement of problem/opportunity (Section 3.1.1);
- the alternatives considered (Sections 3.5 and 4.2);
- a description of the environmental effects associated with the project and all reasonable alternatives (Sections 1.1.3 and 5.4); and
- an outline of the commitment for further work to be undertaken relative to identified "environmentally significant areas/issues" (Section 5.4 and Exhibit 5-6).

Acceptance of the Environmental Assessment document and approval of the undertaking by the Minister of Environment and Energy will allow the Ministry of Transportation to:

- designate the right-of-way for the recommended alignment and file a designation plan under the Public Transportation and Highway Improvement Act;
- acquire property for implementation of the undertaking;
- refine the alignment and right-of-way requirements during the design phase;
- design, construct, operate and maintain a 4-lane freeway facility within the right-of-way; and
- initiate a process for addressing new concerns regarding the undertaking.

Proceeding to implementation will also require securing all necessary additional approvals under provincial and federal statutes.

The approvals being sought by this EA and the commitments made in the EA will apply to and be binding upon the Ministry of Transportation of Ontario, its agents, successors, transferees and/or assignees, and will be applicable to the design, construction, operation and maintenance of the undertaking.

1.3 Canadian Environmental Assessment Act

While this EA must be completed following the requirements of the Ontario EA Act it must also comply with the requirements of the federal government's Canadian Environmental Assessment Act (CEAA). Table 1-1 identifies the main "triggers" identified to date under CEAA and their applicability to the recommended undertaking, while the Act is discussed further in Section 5.3.5. Where permits are required, application will be made during the design stage.

It should be noted that, at the time of EA submission, there is no commitment to, or definition of, a specific year or time frame for design and construction of the new Link.

TABLE 1-1: CEAA TRIGGERS

"Trigger"	Applicability to the Project
• Canadian Coast Guard - under the Navigable Waters Protection Act (NWPA)	• the Holland River is considered a navigable watercourse • application for approval under NWPA will be made during the design stage for any crossing
• Canadian Transportation Agency (CTA) - any railway crossing requiring an authorization under the Railways Act	• application for the approval of the construction of the CN crossing will be made to the CTA during the design stage if agreement cannot be reached with CN
• Department of Fisheries and Oceans (DFO) - following a review by the Ontario Ministry of Natural Resources the project may be referred to the DFO for authorization if there is harmful alteration or destruction of fish habitat	• mitigating measures for potential effects to fish and fish habitat to be reviewed with the Ontario Ministry of Natural Resources, who will determine the need for referral to DFO
• Indian and Northern Affairs Canada - if project affects First Nation lands	• no First Nation lands were identified as being affected during the study
• Federal funding or federal lands involvement	• not applicable

2.0 OUTLINE OF STUDY AND CONSULTATION PROCESSES

2.1 Study Process for Transportation Planning and Route Planning

In order to outline the planning process which the Ministry of Transportation intended to follow for this study, and to solicit both public and external (non-MTO) agency comment on the proposed process, an Environmental Assessment Proposal (EAP) Report was prepared. The report followed the Ministry of the Environment's "EAP Guidelines - 1992" and specifically addressed the following:

- need and justification
- the area to be studied
- the transportation alternatives to be considered
- the screening and evaluation process to be applied to the transportation alternatives; and
- the public and agency consultation to be undertaken

Exhibit 2-1 summarizes the study process for this study. Brief descriptions of each step follow. The consultation process is described separately in Section 2.2.

2.1.1 Define Problems/Opportunities to be Addressed

Based on the outcome of previous studies (see Section 3.1.2.1), a knowledge of existing conditions and planned growth in the study area, municipal and provincial planning and policy directions, and preliminary travel demand analysis, a set of problems and opportunities to be addressed and resolved by carrying out the study was identified.

2.1.2 Define Study Area

This step actually occurred in several stages throughout the study, as the investigation of alternatives first broadened to cover alternatives to the undertaking, then narrowed to focus on the preferred method of carrying out the undertaking and, finally identifying the recommended concept plan.

At each stage, the study area was defined in broad enough terms to encompass not only the physical (locational) alternatives being assessed but also the geographic extent of any associated issues, impacts, and mitigating measures.

2.1.3 Information Gathering

The EA Act requires that all aspects of the environment be considered. In order to do so, relevant information was gathered from existing documents, new information from field investigation or technical analysis, and opinions, comments, and technical information from technical agencies and the public.

This work began at a broad level upon study initiation in 1991 with a review of earlier reports, and continued through to 1997 with detailed site investigation of key aspects of the recommended plan.

ENVIRONMENTAL ASSESSMENT PROCESS

Study Steps	Timeframe	Description
Problem/ Opportunity Statement	1993	Location and extent of problems / opportunities reviewed as part of draft Environmental Assessment Proposal
Alternatives to the Undertaking	1993	All modes considered
		FIRST ROUND OF PUBLIC CONSULTATION
Analysis of the Alternatives to the Undertaking	1993	Carry forward "Roadway Infrastructure Addition"
Corridor Assessment	1993/94	"New Roadway " corridors assessed; travel demand modelling undertaken
Focusing of Study Area	1994	Preferred corridor is Bradford ; define the study area on that basis
Identify Alternative Routes	1994	Reasonable freeway routes drawn
		SECOND ROUND OF PUBLIC CONSULTATION
Analysis of Alternative Routes	1994/95	Detailed analysis using factors, criteria and indicators
Evaluation of Alternative Routes	1995/96	Evaluation based on public and Project Team weighting of criteria
Identified Additional Routes		
Definition of Technically Preferred Route	1996	Project Team's technical preference and its rationale placed before the public for review
		THIRD ROUND OF PUBLIC CONSULTATION
Refinement/Detailing of Preferred Route	1996	Finalize concept plan, based on public input and technical analysis as required
Preparation of Environmental Assessment Report (EAR)	1997	Document entire study process
Submission of EAR for Review and Approval	1997	Simultaneous public and agency review under the Environmental Assessment Act leads to approval decision by the Minister of Environment and Energy

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY PROCESS

EXHIBIT 2-1

All decisions made throughout the study process were based on the most recent information available at the time. In the event that new information subsequently came to light or more detailed investigation was carried out, any affected decision was revisited by the Project Team to confirm its validity and to make any necessary modifications.

2.1.4 Identification of Environmentally Significant Areas/Issues

The guidelines prepared by the Ministry of Transportation of Ontario (MTO) in conjunction with the Ministry of the Environment (MOEE) for the preparation of Environmental Assessment Report One-stage Submissions define environmentally significant areas/issues as follows:

> *"Areas/issues of the natural, cultural, economic and social environment for which the reviewing ministries/agencies/public require detail relative to specific environmental impacts and commitment to mitigation. This information is necessary to facilitate decision-making relative to the acceptance of the environmental assessment and approval of the undertaking."*

In the preparation of this EA, issues or concerns of the natural, cultural, social and economic environment were considered to be environmentally significant in terms of impact if one or more of the following situations applied:

i) the issue or concern was identified as environmentally significant in Provincial, Regional or local plans, policies or studies;

ii) the issue or concern was identified as environmentally significant during the consultation process by any of the following:

- external ministries or agencies
- municipalities
- interest groups
- the general public

iii) the issue or concern was identified as environmentally significant during field surveys and investigations and analysis undertaken by the Project Team.

Environmentally significant areas/issues for the current study are summarized in Section 4.1 and were used as the basis for the assessment of alternative solutions.

2.1.5 Identification of Alternatives

The EA Act requires that alternatives be considered in determining solutions to the stated problem. These alternatives, referred to as Alternatives to the Undertaking, are generally broad in scope (i.e. road improvements, transit initiatives, etc.) and functionally different.

The Alternatives to the Undertaking are:

- Do Nothing (maintain existing conditions)
- Manage Transportation Demand (implement measures to reduce, shift, or eliminate transportation demand)
- Improve Existing Roadways and/or Roadway based Modes (e.g. transit)
- Introduce New Non-Roadway based Facilities and/or Non-Roadway based Modes

Combinations of the above are also considered.

The intent of identifying "alternatives to the undertaking" is to ensure that the preferred solution is based on the relative benefits and impacts of the possible ways of addressing the stated problems/opportunities.

Following a screening of the "alternatives to" (see Section 2.1.6), a limited number of reasonable alternatives remained. The next step was to generate a set of "alternative methods of carrying out the undertaking". For example, if "new road" was a viable "alternative to", then the set of "alternative methods" would consist of different new road types (arterial, highway, freeway, etc.).

Following the identification of the preferred alternative method and the development of alternatives, other alternatives continued to be generated in response to public/agency input and by the Project Team itself to reflect an evolving understanding of the constraints and opportunities present in the study area.

In some cases, new alternatives were identified only after the analysis and evaluation of similar alternatives was complete. A decision was then made to either discard (dismiss with due regard) the alternative on the basis of a direct comparison of its key features/benefits with those of the preferred alternative or to step back and incorporate the new alternative in a comprehensive reassessment of the earlier analysis and evaluation. One example of such "stepping back" is the comparison of freeway alternatives in the Highway 9 - Green Lane area with those in the Bradford area carried out in 1995 in response to interest group and general public input following review of the corridor alternatives in the 1994 Environmental Assessment Proposal.

2.1.6 Analysis and Evaluation of Alternatives

The planning process for the this study primarily took the form of narrowing down alternatives, from the broad range of potential solutions down to the particular plan and concept ultimately put forward for approval. To do so required gathering relevant information to a level of detail appropriate to the stage in the process and the application of consistent and traceable comparative factors to the alternatives.

To allow a satisfactory comparison to be made, information was gathered and grouped under five broad environmental factors: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. This framework is documented in Section 4.2.

Using the factors, the comparisons were made at the following stages:

1. **Alternatives to the Undertaking** - The Project Team evaluated the alternatives based on how each would address the problem/opportunity, resulting in the preferred alternative to the undertaking.

2. **Alternative Methods of Carrying Out the Undertaking** - The Project Team considered different methods of applying the preferred alternative to the undertaking and determined the method which would best address the problem/opportunity and carried it forward for further evaluation.

3. **Alternatives Based on Preferred Alternative Method** - The Project Team evaluated alternatives in greater detail based on information gathered. A detailed assessment of potential impacts for each of the environmental factors was prepared for the alternatives then a ranking was carried out by the Project Team based, in part, on input from the Public on the importance of the factors. The result of the evaluation using both a numerical and trade-off (comparison of advantages and disadvantages) method was the technically preferred alternative.

4. **Recommended Concept Plan** - Further technical analysis of the preferred alternative was carried out to identify improvements which would further minimize potential impacts or increase overall benefit. The result was the recommended concept plan (the undertaking).

2.1.7 Concept Design for Preferred Alternative

As the process moved forward, it involved the development of scale plans of the alternatives at increasing levels of detail in order to produce the information necessary to support the analysis of alternatives and the rationale for choosing the preferred alternative.

In several specific areas, the preferred alternative was studied in greater detail in order to improve the concept plan and to address specific design issues. In each case a limited number of refinements to the recommended concept were developed and analyzed using only the relevant environmental factors. In some areas, the analysis was strictly technical in nature (e.g. indicators such as cost, traffic safety, etc. predominated) while other decisions required a broader review of criteria along with public input and external review.

The end result was a concept plan of the preferred alternative which was capable of serving as the basis for the request for EA approval and subsequent property protection activities.

2.1.8 Preparation of Environmental Assessment Report

The 400-404 Link Study has been carried out with the aim of producing an EA report suitable for submission to the Ontario Ministry of the Environment (MOEE) for review and approval. Accordingly, all of the technical work done to date has been structured and documented so as to be readily incorporated in the EA report.

This EA report therefore compiles excerpts and adaptions from several interim reports and other material, and key supporting documents are themselves appended to this report. Specific major EA report components are drawn from:

- draft and final Environmental Assessment Proposal Report
- Environmental Technical Reports (Inventory and Analysis of Existing and Future Conditions) - Transportation and Utilities, Natural Environment, Social Environment, Economic Environment and Cultural Environment
- Travel Demand Forecasts Report
- Comparison of Alternative Routes within Newmarket and Bradford Corridors Report
- Summary of Analysis and Evaluation of Alternatives Report
- Summary Reports of First, Second, and Third Rounds of Public Consultation

All of these documents have been made available for public and agency review , and any feedback received has been considered in the preparation of this overall document.

The EA report provides a formal synthesis of the information produced during the study along with an explanation of the technical and consultation process followed. In doing so, it reflects the requirements of the Environmental Assessment Act R.S.O. 1990 by documenting the planning process, its conclusions, and the rationale for the proposed undertaking. Specifically, the EA report contains the following:

- the purpose of the undertaking (Chapter 1)
- the environmental assessment process followed (Chapter 2);
- the purpose of the study (problem/opportunity statement) (Chapter 3);
- the environmental conditions in the study area (Chapter 4);
- the alternatives considered (Chapters 3 and 4);
- an assessment of the environmental effects associated with the undertaking and the reasonable alternatives (Chapters, 3, 4 and 5);
- the description of the undertaking (Chapters 4 and 5);
- the commitment to further work to be undertaken relative to identified "environmentally significant areas/issues", and action to address environmental effects (Chapter 5); and
- the process for addressing new concerns (Chapter 5).

As noted in Section 1.2, the Environmental Assessment Act was amended in 1997. Therefore, the Ministry of Transportation is submitting this environmental assessment under the 1990 statute in accordance with the transition provisions of the amended Environmental Assessment Act.

2.2 Consultation Process for Transportation Planning and Route Planning

2.2.1 Study Organization

Exhibit 2-2 provides an overview of the parties involved in the study and their interrelationship.

Project Team

The Project Team consisted of staff from the Ministry of Transportation and the Consultant, who were responsible for the overall direction, day-to-day activities, and the results of the study. It should be noted that the MTO Project Manager also managed the concurrent and closely-related Highway 404 Extension Environmental Assessment Study.

MTO Internal Team

The "Internal Team" consisted of Ministry of Transportation staff, who were corresponded with and met with on occasion to provide technical input as required by the Project Team. Exhibit 2-2 identifies the various Ministry offices that were consulted.

External Team

This grouping included all interested Provincial government agencies having a responsibility to comment on and review projects submitted under the Environmental Assessment Act of Ontario. Participation was by individual and group meetings, correspondence, and through formal review of the study findings by External Team members prior to submission of the Environmental Assessment Report for the study. Exhibit 2-2 identifies the Ministries involved in this study.

Other External Team members included the Federal Ministries with an interest in certain aspects of the work, agencies such as GO Transit and the Lake Simcoe Region Conservation Authority, and all of the utility providers in the area.

Municipal Technical Committee

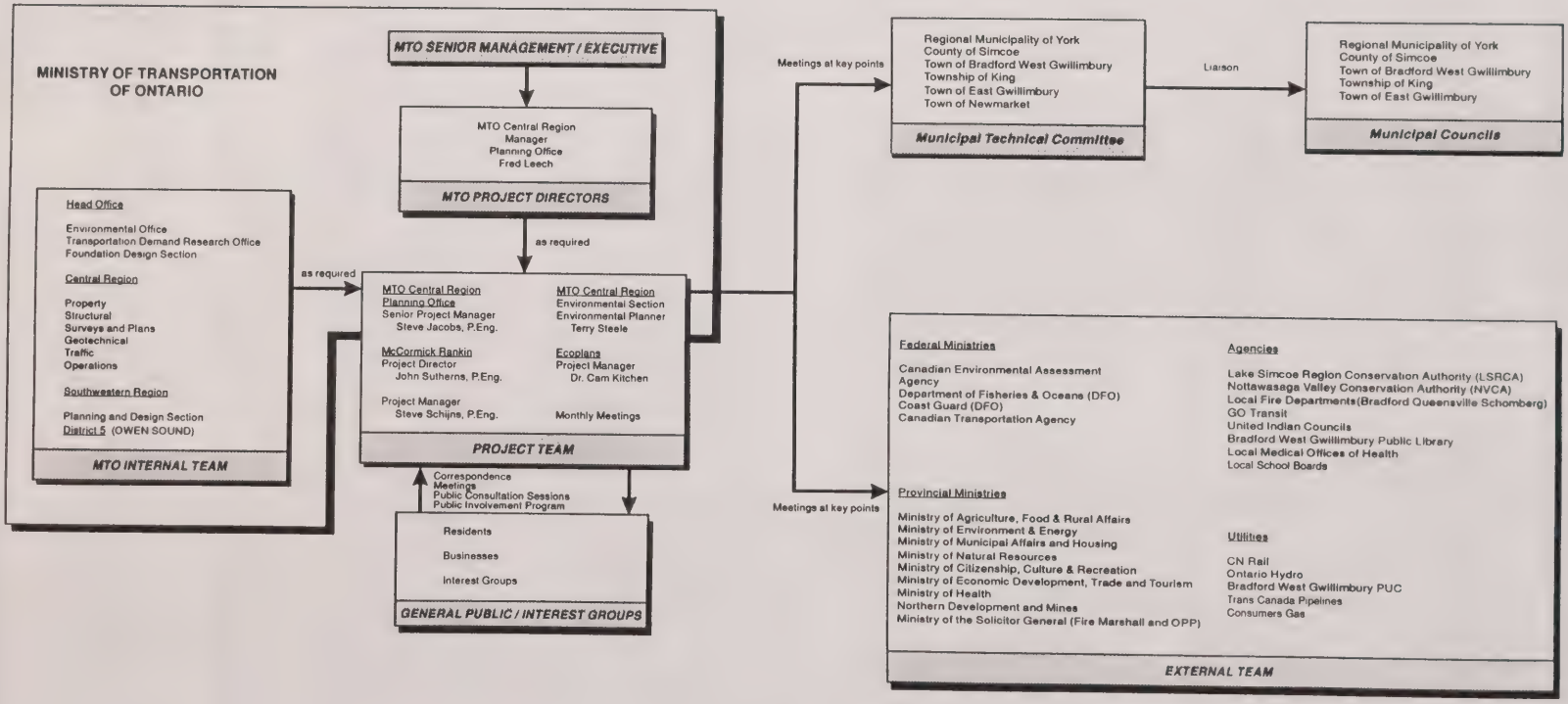
Senior planning and engineering/works staff of affected municipalities reviewed study progress and advised the Project Team on issues arising from the study. The municipalities from which committee members were drawn are illustrated in Exhibit 2-2. Committee members provided liaison between the Ministry of Transportation and their respective Municipal Councils. Presentations were made by the Project Team to interested Municipal Councils as required. This committee was essentially continuing the work of the group established during the review process for the Highway 404/89 Overview Study, which preceded and formed the basis for the current study (see Section 3.1.2.1).

Interest Groups

Formal organizations of people oriented towards a common interest relevant to the study and/or study area were sought out over the course of the study, and were provided with information to determine the level and focus of their interest in the study. Agricultural, environmental, business, and community groups were included in this category, and a limited number became directly involved in the study as a consequence. Two very active interest groups included:

- HEART - (Heritage, Environment, Agriculture, Recreation, Tourism) This is a Bradford based group interested in the increased and continued vitality of the community of Bradford; and

- FROGS - (Forbid Roads Over Green Spaces) This group was formed by River Drive Park-area residents (in East Gwillimbury) in response to the MTO's proposal of a new freeway route in the Bradford corridor as outlined in the EAP



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY ORGANIZATION

EXHIBIT
2-2

Interest groups associated with this study are included in Exhibit 2-2.

General (Unaffiliated) Public

Individuals who expressed an interest in the study either in writing or by attending a public meeting or consultation session (refer to Section 2.2.2) were corresponded with directly, and several opportunities were provided over the course of the study for any interested person to review and comment on the study findings. All directly affected property owners were sought out via addressed correspondence. General public consisted mainly of residents of the study area, with lesser numbers of property owners external to the study area, investors, recreational users, and those with an interest in planning or environmental issues. As is typical of a long term transportation planning project, little could be done to involve the actual highway motorists in the study, although some commuters did participate in the process.

2.2.2 Consultation Plan

Consultation with the review ministries and agencies, municipalities, elected representatives, landowners, special interest groups and the public has been a key component of all phases of this study. The consultation plan was established in 1993 in the EA Proposal, and has assisted the project team in:

- identifying relevant concerns of the various parties so that appropriate consideration could be given to these matters as decisions and commitments were made relative to the preferred planning solution or specific design proposals;
- identifying environmentally significant areas/issues;
- identifying alignment alternatives ;
- ensuring that appropriate mitigating measures are identified and considered to minimize potential adverse effects; and
- ensuring that any commitments to future work are clearly outlined and documented.

As a result of the consultation process there were many actions taken to address comments and issues/concerns. An overview of the actions taken to respond is included in Sections 2.3 and 4.2.4.

Exhibit 2-3 summarizes the key events and milestones marking the consultation process between 1993 and 1997. An expansion of the process and results of the three rounds of public consultation is found in Appendix C. A summary of contact with all municipalities, government agencies, interest groups, and members of the public is included in Exhibit 2-4. Selected correspondence, minutes from meetings, and newspaper articles are included in Appendix E.

2.2.2.1 Public Consultation

The Consultation Plan used a variety of mediums to ensure public awareness of the study and to provide opportunities at any point during the study for public input. Mediums included the following:

- Public Consultation Sessions (PCS)
- Infosource Hotline (a "1-800" MTO phone line)
- newspaper advertisements/articles (see Appendix E)
- TV news
- a mailing list for study notices
- comment sheets provided at PCSs
- faxes, letters, e-mails, phone calls
- individual meetings with property owners/residents
- individual response to most comments received

The most significant component of the consultation plan was the Public Consultation Session (PCS). The PCS was a tool which was used to identify public concerns and issues relating to the study and a way of exchanging ideas and information with members of the public. Three PCSs were arranged at key points in the study in order for the public to provide input on:

- the Environmental Assessment Proposal (EAP)
- the identified route alternatives
- the analysis and evaluation and the technically preferred alternative

A summary of the PCSs is provided below. An expansion of these events, the information presented, and the comments received from the public is included in Appendix C.

In addition to the PCS component of the consultation plan, an informal public meeting was held by the MTO and other meetings and workshops were hosted by area interest groups. These meetings primarily were to provide a forum for group discussion for study area residents' issues and concerns with the study and its proposals. Four such meetings were held and are summarized following the PCS summaries. Minutes from these meetings are included in Appendix C.

The MTO also carried out an economic impact study (see Appendix I) which included a survey of all Bradford area businesses.

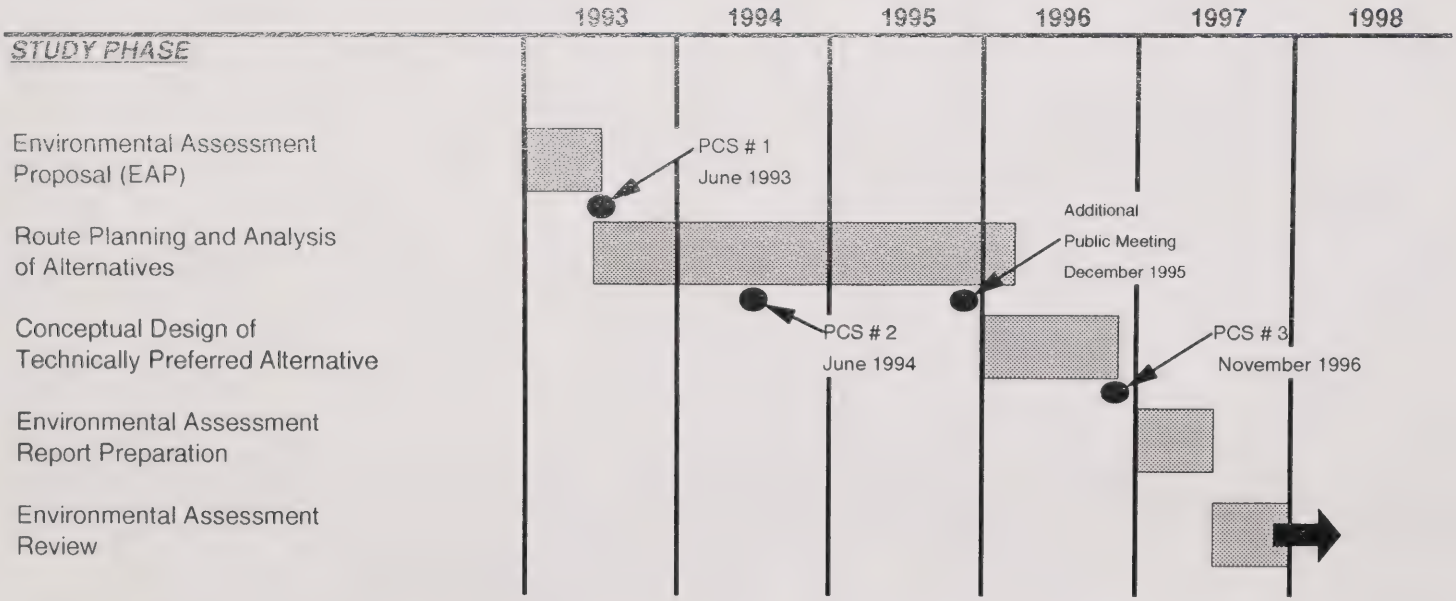
i) Public Consultation Sessions

The following Public Consultation Sessions were held:

PCS #1	-	Bradford	June 7, 1993
		Queensville	June 22, 1993

The intent of the first round of PCSs was to allow the public to review the contents of the draft EAP and provide comments on it as well as suggestions for consideration in the subsequent phase of the study. Specifically, the public was requested to identify any issues, concerns or comments they might have regarding:

- the proposed study area
- need and justification for the study
- alternatives to the undertaking



PCS # 1 - June 1993
- Introduce the Study
- Present the Draft EAP
- Receive Input Regarding Issues / Concerns

PCS # 2 - June 1994
- Review of Revised EAP
- Identify Alternative Routes
- Identify Study Area Constraints
- Distribute Questionnaire
- Present the Proposed Evaluation Process

Additional Public Meeting - December 1995
- Discuss Comparison of Hwy. 9 / Green Lane / Newmarket vs. Bradford Corridors

PCS # 3 - November 1996
- Review the Analysis and Evaluation of Routes
- Present the Technically Preferred Route

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	PUBLIC CONSULATION PLAN	EXHIBIT 2-3

- alternative methods of carrying out the undertaking
- study process and proposed consultation program
- the draft Environmental Assessment Proposal

The consultation sessions were well-attended, with approximately 120-150 visitors to the Bradford site and 250-300 at Queensville. All of the Queensville attendees had addresses east of the Holland River, while the Bradford session was attended almost entirely by residents west of the river.

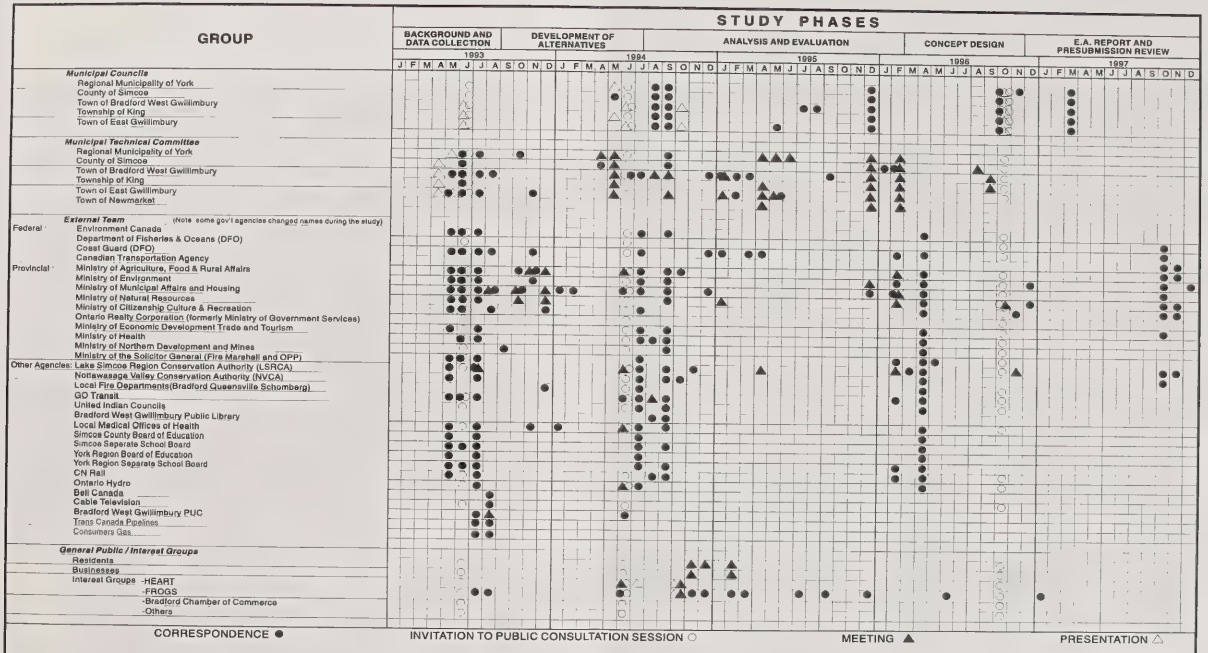
PCS #2	-	Queensville	June 14, 1994
		Bradford	June 16, 1994

The intent of the second round of PCSs was to allow the public to review and provide comments on:

- the alternatives
- the evaluation criteria and weighting, and the proposed evaluation process
- study area constraints and impacts
- the revised Environmental Assessment Proposal

A questionnaire was distributed to members of the public, at the PCS which surveyed the public's opinion with regard to the weighting of evaluation criteria.

The consultation sessions were generally well attended with approximately 290 and 160 attending the Queensville and Bradford sessions respectively.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

SUMMARY OF CONTACTS

EXHIBIT 2-4

PCS #3	-	Bradford	November 14, 1996
		Sharon	November 19, 1996

The intent of the third round of public consultation was to provide the public with the opportunity to review and provide comments on:

- the analysis and evaluation of the various alternatives; and
- the Technically Preferred Alternative

FROGS (Forbid Roads Over Green Spaces), a local interest group opposed to the proposed location of the Bypass, had representatives attending both the Bradford and Sharon PCSs. At each location they set up an information booth outside the entrance of the PCS and spoke with people regarding the study findings.

The PCSs were well attended, with approximately 200 and 260 attending the Bradford and Sharon sessions, respectively. A total of 195 comment sheets were received at, or subsequent to, the PCS. Seventy-one of the comment sheets received were of a petition type distributed by FROGS which outlined their opposition to the location of the Technically Preferred Route.

It should be noted that each of the PCSs held in East Gwillimbury were held jointly with the concurrent Highway 404 Extension EA, which accounts in part for the higher attendance figures.

ii) Public Meeting - December 11, 1995 in Sharon

A public meeting was arranged in order for the public to have an opportunity to review and comment on the comparison of alternatives within the Highway 9/Green Lane/Newmarket corridor and the Bradford corridor.

Approximately 100 people attended the meeting which included display panels for public review, a presentation by the Project Team and a question and answer period. FROGS also set up a separate display outside the meeting room entrance and distributed material which outlined their opposition to the study. A summary of the questions/comments posed at the meeting is included in Section 4.2.4. Minutes of the meeting are included in Appendix C.

iii) Interest Group Meetings

- The Project Team was invited to make a presentation to the Bradford and District Chamber of Commerce at a regularly scheduled meeting on June 15, 1994. The presentation was advertised by the Chamber of Commerce and consisted of an overview of the study results to date followed by a question and answer period. The main concerns of the Chamber of Commerce membership were the potential impacts to businesses in Bradford, and the opportunities for compensation.

- HEART held two meetings: a public workshop on July 28, 1994 following the second round of PCSs; and a public meeting on October 20, 1994. The MTO and its consultant were invited to make a presentation and answer questions and respond to comments at both

meetings. At the workshop on July 28, 1994, four discussion groups reviewed and discussed the 1:50,000 scale alternative plans. Their comments are summarized in Section 4.2.4. Minutes of the meeting are included in Appendix C.

- FROGS - A meeting was held on November 28, 1994 by FROGS at the River Drive Park Community Centre to provide a forum for the expression of local residents' concerns. The MTO and its consultant were invited to make a presentation and answer questions and respond to comments. More than 200 people attended the meeting including five Councillors, the mayor of East Gwillimbury, and a representative of the local MP. The Black River Protection Association was in attendance as well and indicated their support of FROGS' goals. A summary of issues discussed at the meeting is included in Section 4.2.4. Minutes of the meeting are included in Appendix C.

2.2.2.2 Future Design Consultation

The consultation process culminated with the preparation, distribution, and pre-submission review of a draft version of this Environmental Assessment Report. Comments and input provided by reviewing parties through this pre-submission review step have been taken into account (refer to Section 4.3) in the preparation of the final document.

Because the design and construction phases of the concept plan are not scheduled and because there are a number of commitments related to the design stage which can not be specifically addressed at this time, there is a need to provide for and commit to an effective post-submission consultation process for the future design phases. This is outlined in Section 5.3.

2.3 Overview of Changes Resulting From Consultation

As a result of the consultation process there were many actions taken by the MTO and by the community to address comments and issues/concerns. In several instances changes were initiated which would improve the location of an alternative or require a more detailed assessment in order to determine the significance of any potential impacts. A summary of actions taken as result of consultation is included in Section 4.2.4, while a general review of key changes follows below.

Route Alternatives

Route alternatives were reviewed with the public through the second and third rounds of public consultation and at the public meetings and workshop noted in the previous section. In response to interest expressed by some area residents in considering alternative corridors in greater detail, the Ministry undertook a comprehensive corridor analysis for inclusion in the final EAP. This expanded considerably on the material in the draft EAP. Ultimately, a focused multi-factor analysis, public review and final report on a comparison between alternatives in the Newmarket area and near Bradford was undertaken so that both the Project Team and the public fully appreciated all of the trade-offs and demands involved in corridor selection.

In other specific locations in the study area alternative routes were suggested by members of the public and thus were included in the evaluation of alternatives (refer to Section 4.2.3.4 and 4.2.3.5).

In addition, shifts to alignments were considered following consultation with directly affected property owners during the study.

Public Consultation

Some members of the public and the interest group FROGS viewed the EA process as not being sufficiently open to public input and lacking public awareness. As noted in Section 2.2, a comprehensive public involvement program was carried out over a three year period; this incorporated several public meetings with different formats (presentations, question and answers, workshops, open houses, etc.) and different proponents (MTO, HEART, and FROGS themselves). These meetings are discussed in detail in Section 2.2.2.1. Minutes of these meetings are included in Appendix C.

In addition to the normal publicity efforts, a free local phone "Hotline" operated for two years, and local newspapers (in particular the Bradford West Gwillimbury Times) featured articles on the project on dozens of occasions, often on the front page.

Heritage Resources

The preferred alternative was presented to the public at the 3rd set of public consultation sessions at which time a number of people commented on the potential significance of an area where the preferred alternative crosses the Holland River East Branch. As a result of these comments the Ministry undertook a comprehensive archaeological survey of the Holland River area adjacent to the preferred alternative.

The results of the fieldwork formed the basis for a proper understanding of the history of the site and for the appropriate commitments to mitigation to be made in the EA report. This is documented further in Section 5.4.5 and Appendix J.

Business Community

Potential effects to the existing Bradford business community was a significant concern to the interest group HEART as well as to other members of the public. HEART hosted public meetings (with MTO support and participation) to enhance public awareness and involvement in the study as noted above and detailed in Section 2.2.2.1. Meetings with individual business owners directly affected by the preferred alternative also took place as needed to ensure that potential impacts were properly assessed and to identify possible refinements.

The Ministry, in order to respond to concerns expressed by Bradford businesses regarding the potential impact of the recommended plan, commissioned an economic impact study which incorporated a survey of all Bradford commercial enterprises. The survey results were shared with the business community and formed the basis of both an improved understanding of the nature of the existing downtown and of the conclusions of the study regarding project impacts (see Appendix I). In addition, results of the study were presented at a regular meeting of Bradford West Gwillimbury Council on December 16, 1997; formal notification of the presentation was made to the local Chamber of Commerce and HEART.

3.0 TRANSPORTATION NEEDS ASSESSMENT

Much of the material in this section of the EA report is drawn directly from or is summarized from the Environmental Assessment Proposal (EAP) for the project, published in draft form in May, 1993 and as a final document in September, 1994.

3.1 Problems and Opportunities

3.1.1 Problem / Opportunity Statement

The current study addresses several transportation problems which have been identified in the northern part of York Region and southeastern Simcoe County. The identified problems are related to the Ministry's mandate to provide for the safe, efficient movement of people and goods between regions and between urban areas. Associated with the problems are unique and important opportunities which may play a significant role in the resolution of the problems.

The identified problems are:

- **Traffic Problems** - Traffic operational and distribution problems exist as a result of the incomplete and fragmented nature of the provincial highway system in the study area, particularly with respect to the termination of provincial highways at lower-capacity municipal roadways (e.g. Highway 9 at Davis Drive, Highway 404 at Davis Drive).

- **Road Discontinuities** - Inefficient, out-of-the-way travel results from the presence of physical and operational discontinuities in the major road network, particularly with respect to the barrier to east-west travel formed by the lack of a crossing of the Holland River north of Highway 11 at Bradford.

- **Future Demand Growth Implications** - The current transportation system is not adequate in terms of both capacity and location / orientation to accommodate future travel demand, particularly with respect to the significant growth in travel demand forecast for trips to, from, through and within the study area.

- **Lack of Long Term Plan** - The transportation and land use concepts of municipal Official Plans in the study area rely to a considerable extent on the presence of the provincial highway network; the lack of a defined, approved long term highway network plan in the northern part of York Region and southern Simcoe County places constraints on the provincial and municipal planning process in the area.

Two significant opportunities are present with respect to transportation in the study area:

- **Relieve Congestion** - There is potential for an improved transportation system to relieve some roadways which are currently (or are forecast to be) severely congested, and which suffer consequences as a result of congestion in the form of higher noise levels, increased community disruption, decreased safety, and inhibition of development.

- **Protect Property** - The opportunity to define and protect an adequate property envelope for the "ultimate" transportation system before all feasible routes / corridors are committed to other uses or are developed is in many cases a vital part of a successful community plan.

3.1.2 Background Information to Problem / Opportunity Statement

3.1.2.1 Previous Studies

The MTO and local municipalities have been studying improvements to the transportation system south of Lake Simcoe for many years. This work culminated in the recommendation of a new two lane roadway between Highway 400 and Ravenshoe Road and the upgrading of the latter. The Ministry, however, withdrew support for the plan (known as the Highway 89 Extension) in 1986, on the basis that the environmental impact outweighed the transportation benefits in the particular location under consideration."

Immediately upon the cancellation announcement for the Highway 89 plan, considerable municipal pressure was brought to bear on the MTO to continue to work to address the unresolved transportation issues in the area south of Lake Simcoe. The Ministry and affected municipalities (York Region, Durham Region, Simcoe County, Town of Newmarket, Victoria County, Town of Georgina) worked together over the 1986 - 88 period to define a set of objectives as a basis for future studies in the area. Among the objectives endorsed by all the parties was to choose an environmentally acceptable westerly route north of Bradford and south of the Keswick Marsh connecting Highway 404 to Highway 400.

Based on the MTO / Municipal dialogue of the preceding years, the MTO undertook a broader study of the provincial transportation network in the Lake Simcoe basin, with a view to developing an appropriate long range highway strategy for the area. Assessment was made of travel demands on a variety of network alternatives, incorporating both an extension of Highway 404 northerly from Newmarket around the east side of Lake Simcoe as far north as Highway 11 near Gravenhurst, and improvements in the Highway 400 corridor.The value of a linkage between the parallel north-south freeways south of Lake Simcoe as a means of accommodating travel demand for crossing between corridors was also assessed.

The recommendations of the Overview were to undertake route planning and EA studies for both a link between Highway 400 and the future Highway 404 (i.e. the current study) and the portion of the Highway 404 Extension between Davis Drive and Highway 12. Both the study objectives and recommendations were endorsed by the affected municipalities in 1990. The recommendations provided the MTO with the basis for proceeding with the Route Planning and Environmental Assessment Study for the Highway 400 - Highway 404 Extension Link (the current study), which it initiated in 1991, along with the similar and concurrent study of the Extension of Highway 404 to Highway 12.

3.1.2.2 Travel Demand Analysis

a) Background

The traffic modelling work for this study made use of recent advances in travel demand forecasting techniques. In particular the development of a Greater Toronto Area EMME/2 computer model utilizing up-to-date Transportation Tomorrow Survey (TTS) travel demand data and current land use plans and projections, as applied by York Region in the development of its future transportation plans. Being a regional-scale model, both the Highway 404 Extension and the 400 - 404 Link as well as all of the municipal arterial roads and other highways were modelled together and under common assumptions for a variety of scenarios.

The travel demand analysis was published as a final report in November, 1996 (included here as Appendix A). A brief synopsis of the analysis follows.

b) Demand Growth

Traffic on area roads has grown substantially over the past three decades, as the study area and surroundings have been gradually transformed from independent rural communities to more urban areas fully integrated into the Greater Toronto Area economy and commutershed. Population growth, demographic and economic changes, lengthier commuter trips, increased recreational travel, and a shift from rail to road modes for goods movement have all contributed to this traffic increase. Although some improvements (road widenings, intersection signalization, etc.) have been made to the road network in response to the increase in demand, little in the way of new routes has been added to the basic road network over that period.

Exhibit 3-1 encapsulates this growth, first in terms of population (which corresponds roughly with the demand for travel) and then in terms of traffic volumes experienced on area roadways. A comparison of the 1972 and 1992 traffic figures show that volumes on some roadways increased by two to three times over that period. Population growth has continued unabated through the mid-1990s and is substantial growth planned for the future.

c) Modelling Considerations

The travel demand modelling process necessarily involves significant assumptions and the simplification of complex and variable interactions between varying input parameters. In addition to basic input data such as land use, trip generation, and transportation system capacity, when reviewing model output consideration must be given to:

- vehicle occupancy rate assumptions;
- truck volumes (the model considers only car travel and adjustments must be made to account for truck presence);
- trips within traffic zones (models are based on interzonal trips and do not "show" trips on streets within one zone);

POPULATION GROWTH

Year	Simcoe County			York Region			Greater Toronto (incl. York Region)	Muskoka District
	Bradford West Gwillimbury	Barrie	Total	East Gwillimbury	Newmarket	Total		
1966	5,000	24,400	134,600	12,200	8,800	130,600	2,441,600	24,800
1976	9,100	34,100	208,100	10,600	24,500	204,400	3,203,500	34,600
1981	11,500	-	225,800	12,600	31,000	252,300	3,413,000	36,700
1986	13,100	48,000	238,500	14,600	33,200	350,600	3,623,200	37,900
1991	16,600	60,900	274,400	17,400	42,900	476,600	4,004,600	43,000
1996 (est.)	18,200	71,400	303,500	18,000	49,700	560,100	4,360,200	49,600
2001	(2002) 23,000	-	-	-	-	-	4,738,200	49,600
2011	-	-	361,300	26,000	-	744,200	5,917,700	-
Ultimate	-	-	361,300	25,200	-	1,000,000	6,525,600	-

Source: 1967, 1977, 1982, 1987, 1992, 1996, Municipal Directories, Highway 404/89 Overview Ch. 5; Mississauga Busway Readership Forecasts Ex. 2.2; Town of Bradford West Gwillimbury Development Charges Study (1992).

Note: Some inconsistencies may be present due to the variety of sources utilized.

TRAFFIC GROWTH

Highway	Segment	AADT[1]				SADT[2]			
		1972	1982	1992	Average Annual Growth Rate 1972-1992	1972	1982	1992	Average Annual Growth Rate 1972-1992
400	9 to 88	18,150	29,500	46,900	4.9%	27,200	33,900	57,600	3.8%
	88 to 89	20,100	27,500	49,400	4.6%	30,200	38,800	60,700	3.5%
404	S. of Davis	0	0	25,400	-	0	0	27,400	-
88	400-Bradford	4,050	5,700	9,900	4.6%	4,850	6,800	10,900	4.1%
11	S. of Bradford	8,200	13,400	23,900	5.5%	11,000	16,100	25,800	4.4%
	N. of Bradford	3,500	5,200	9,000	4.8%	5,150	5,500	12,500	4.5%
9	400-Newmarket	6,000	10,250	20,300	6.3%	7,200	11,800	21,900	5.7%

1 Annual Average Daily Traffic
2 Summer Average Daily Traffic

Source: Provincial Highway Traffic Volumes, MTO, 1972, 1982, 1992

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	POPULATION GROWTH & HIGHWAY TRAFFIC GROWTH	EXHIBIT 3-1

- planning horizon and associated land use assumptions (models may compile information from a variety of sources using different horizon years);
- link-specific model coding to accurately reflect speed limits and site-specific constraints which may exist under any scenario; and
- daily and seasonal variations whereby "average" daily volume figures may mask substantial differences between months, days, and hours.

The cumulative effect of all these considerations is that the link assignments should not be taken literally as traffic forecasts but rather as indications of the order-of-magnitude travel demands expected under the assumed conditions. Such forecasts are therefore most effectively used in comparing different scenarios under constant model input assumptions.

d) Model Output

Twenty-three traffic assignments were undertaken to assess different demand and network scenarios.

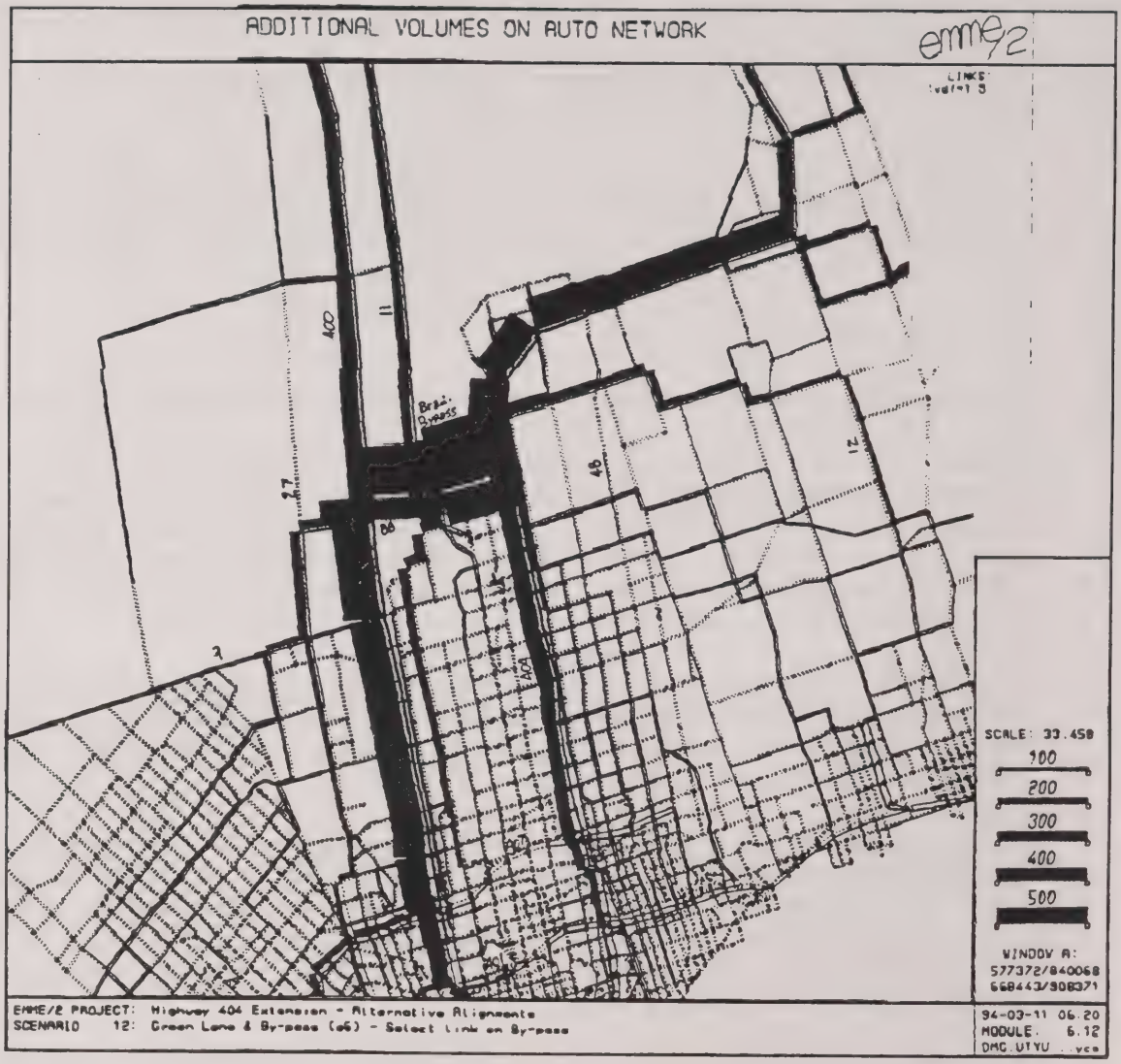
Initially, origin - destination matrices were generated, then applied to different roadway networks. Exhibit 3-2 illustrates the demand pattern of potential users of a new east-west roadway between Highways 400 and 404 north of Bradford. The role of the route as a link and crossover between the parallel north - south freeway corridors is clearly evident, as is the "X" shaped pattern of long distance trips using the route. The "reach" of the road as far south as Highway 401 and northerly past Lake Simcoe attests to its potential role in serving provincial long-distance traffic.

Exhibit 3-3 further illustrates that point, showing the additional demand which would be placed on several arterial roads within York Region in the absence of the new route. Only a small minority of such trips can be made by the other freeways (i.e. 401 and 407) linking Highways 400 and 404, because they are too far south relative to the demand.

All east-west municipal roadways between Queensville Sideroad and Major Mackenzie Drive would be affected if there were no new 400 - 404 link in the network. The circuitous, indirect routing of such trips as they travel the discontinuous arterial road grid in York is evident in Exhibit 3-3. Conversely, the provision of a new highway to absorb high volumes of long distance provincial traffic would allow municipal roads such as Queensville Sideroad to revert to their intended purpose, serving regional and local trips.

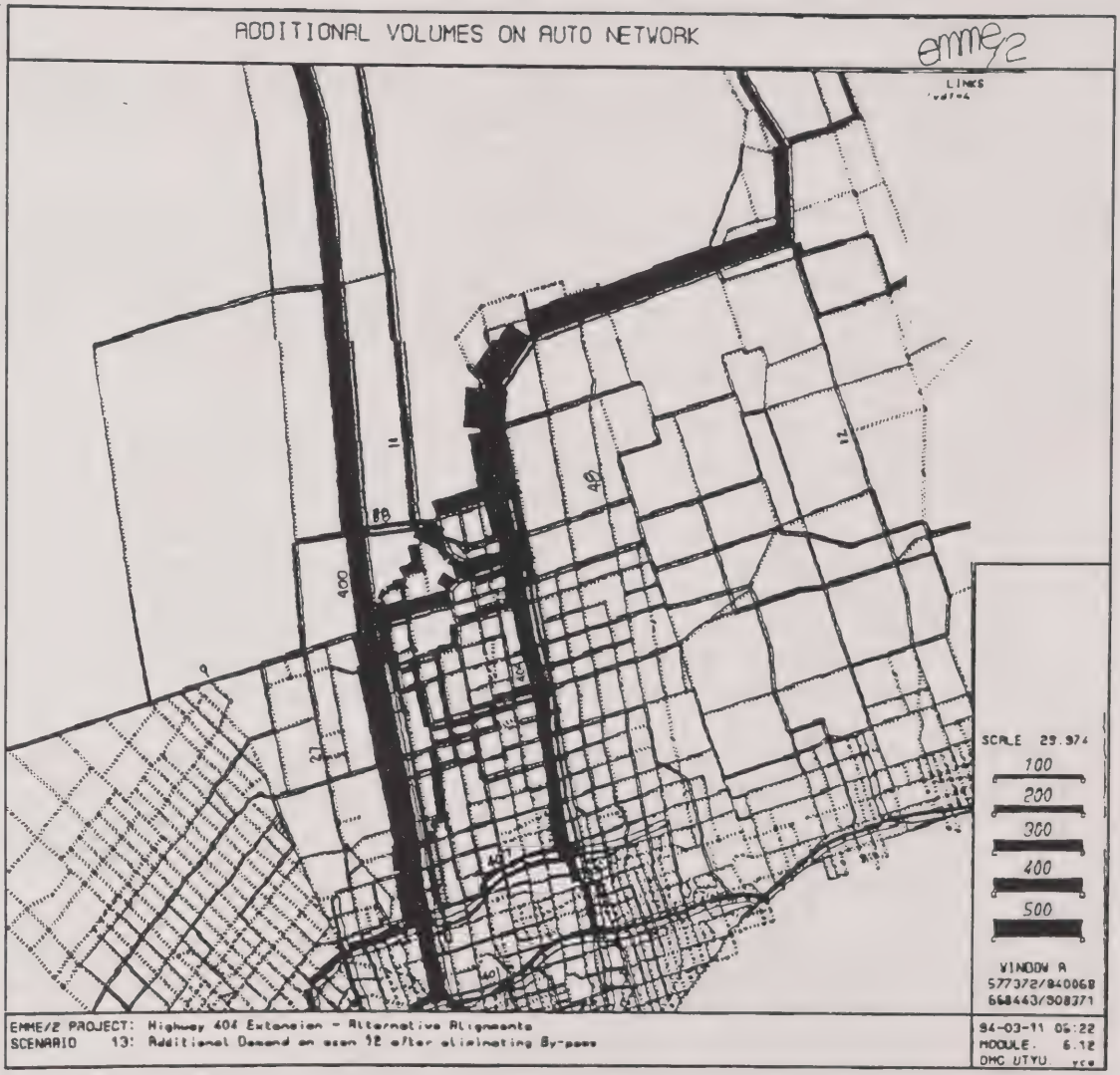
In more closely examining the need for transportation improvements in the Bradford - Newmarket area, a "screenline" approach was taken. A screenline is an imaginary line across which all traffic in a selected area must flow. It is generally located where there are limited opportunities to cross, or, at a political boundary. Three screenlines in the north-south direction were used to analyse traffic flowing in the east-west direction:

- West Screenline: immediately east of Highway 400
- Central Screenline: immediately east of Yonge Street
- East Screenline: immediately west of Highway 404



THIS SHOWS WHERE THE 400 - 404 LINK USERS ARE ANTICIPATED TO TRAVEL - YEAR 2011 A.M. PEAK HOUR

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	**SELECT LINK ANALYSIS-BRADFORD BYPASS USERS**	**EXHIBIT 3-2**



THIS SHOWS THE ROADS THAT 400 - 404 LINK USERS WOULD TAKE IF THE LINK WAS NOT PROVIDED - YEAR 2011 A.M. PEAK HOUR

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	SELECT LINK ANALYSIS-ALTERNATIVE ROUTES FOR BRADFORD BYPASS USERS WITHOUT BYPASS IN PLACE	EXHIBIT **3-3**

The screenlines extend from Mulock Drive in Newmarket to Cook's Bay in order to capture all existing and future east-west routes in the study area. Only the modelled roadways are included in the analysis (i.e. minor / local roads across a screenline are not referred to).

The West screenline has only three crossing points: Highway 9, Highway 88, and the proposed 400 - 404 link (Bradford Bypass). Exhibit 3-4 summarizes both the historical (1972-1992) and modelled future (2011, 2021) daily traffic figures at the screenline.

The screenline data reveal significant and steady growth over the past two decades, with average daily traffic volumes tripling in the 1972 - 1992 period. This has brought demand on Highway 9 very near its practical capacity, and plans are consequently underway to widen it to four lanes. Demand on Highway 88 has not grown as fast, reflecting servicing (sewer and water) constraints on Bradford's growth and capacity constraints on Highway 88 within Bradford which reduce the route's attractiveness for through traffic.

With the planned widening of Highway 9, which will provide a capacity of 60,000 daily vehicle trips at the West screenline, the 2011 trip assignments indicate a daily demand in the 40,000 - 45,000 vehicle range. This is well below capacity and implies no need to provide further capacity improvements. However, without the Bradford Bypass the summer demand at the West screenline would exceed capacity before 2021, and the average daily demand would reach capacity a few years later. This implies the need to protect for the ability to provide for further capacity improvements in the long term. The introduction of the Bradford Bypass would both provide the needed east-west capacity to 2021 and beyond and relieve Highways 9 and 88 of the burden of accommodating long distance trips, resulting in significant improvements in their operation and safety.

The Central and East screenlines include more roadways, but the analysis of the figures in Exhibits 3-5 and 3-6 reveals the same pattern of long-term travel demand on east-west routes, as 2021 travel demand significantly exceeds the available and planned road capacity. Note that only Annual Average Daily Traffic (AADT) figures, not Summer Average Daily Traffic (SADT), are available for the Regional Roads.

Because of the local growth in trip generation (i.e. in Newmarket, Holland Landing, Sharon, Bradford, Georgina, etc.) growth in demand is even more rapid at the Central and East screenlines than at the West screenline. While planned improvements to regional roads such as Green Lane and Mulock Drive will help the network keep pace in terms of east-west capacity for a few years, the model results indicate that their practical capacity will be reached within the forecast horizon period.

Overall, the screenline analysis indicates a continued pattern of east-west travel demand growth, eventually overwhelming all of the existing east-west roadways from Mulock Drive northerly. The magnitude of the unserved demand for east-west travel in the study area (assuming all other roadways operating at capacity) particularly beyond the 2011 time frame, ranges from 0 capacity shortfall at the West screenline to 16,000 AADT at the Central screenline to nearly 30,000 AADT at the East screenline. Summer volumes (and shortfalls) are higher. This magnitude of the capacity shortfall is the equivalent of a two-lane high capacity standard arterial road at the West Screenline and either a six-lane arterial or a four-lane controlled access freeway at the East.

Year	Roadway									Screenline Total			AADT/Cap.	
	Highway 9			Highway 88			Bradford Bypass							
	Cap.[1]	AADT	SADT	Cap.[1]	AADT	SADT	Cap.[1]	AADT	SADT	Cap.[1]	AADT	SADT	w/o Bypass	w/Bypass
1972[5]	24000	6000	N/A	24000	4050	N/A	-	-	-	48000	10050	N/A	.21	-
1982[5]	24000	10250	11800	24000	5700	6800	-	-	-	48000	15950	18600	.33	-
1992[5]	24000	20300	21900	24000	9900	10900	-	-	-	48000	30200	32800	.63	-
2011	36000	13400[2]	14500[3]	24000	4900[2]	5400[3]	72000	23700[2]	28400[4]	132000	42000	48300	0.70	0.32
2021	36000	21900[2]	23600[3]	24000	10200[2]	11200[3]	72000	27400[2]	32900[4]	132000	59500	67700	1.0	0.45

Notes:

1. Capacity is coded as peak hour two-way hourly capacity x 10 (peak hour factor - ratio of highway AADT to peak hour volume)
2. Future Average Annual Daily Traffic (AADT) = modelled a.m. peak hour 2-way volume x peak hour factor x truck factor
   = 2-way AMPH x 10 x 1.1
   = -way AMPH volume x 11

   note: truck factor assumes average of 10% trucks
3. Future Summer Average Daily Traffic (SADT) on highways = SADT/AADT ratio (1992) x AADT
4. Future SADT on freeways = 1.2 x AADT (based on Highway 400 data - see Section 3.1.2)
5. Traffic volumes from annual report, "Traffic Volumes on Provincial Highways", MTO

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	TRAVEL DEMAND AND CAPACITY AT WEST SCREENLINE (EAST OF HYW. 400)	EXHIBIT 3-4

Year	Roadway												Screenline Total			
	74 - Mulock		31 - Davis		Green Lane		13 - Mt. Albert		77 - Queensville		Bradford Bypass				AADT/Cap.	
	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	w/o Bypass	w/Bypass
1981	0	0	26000	20090	9000	N/A	16000	5950	16000	N/A	-	-	67000	N/A	-	-
1991	18000	14730	26000	24650	9000	2500	16000	10080	16000	3990	-	-	85000	55950	.66	-
2011	36000	23900	26000	7900	36000	15400	16000	3450	16000	13900	72000	34100	202000	99000	0.76	0.45
2021	36000	30900	26000	23200	36000	17650	16000	12750	16000	18500	72000	43250	202000	146250	1.13	0.72

Notes:

[1] Capacity is coded as peak hour two-way hourly capacity x12.5(peak hour factor - ratio of highway AADT to peak hour volume)

[2] Future AADT = modelled a.m. peak hour 2-way volume x peak hour factor x truck factor
= 2-way AMPH x12.5 x 1.1
= 2-way AMPH volume x 11

note: truck factor assumes average of 10% trucks

[3] Future SADT on highways = SADT/AADT ratio (1992) x AADT

[4] Future SADT on freeways = 1.2 x AADT (based on Highway 400 data - see Section 3.1.2)

[5] Traffic volumes from annual report, "Traffic Volumes on Provincial Highways", MTO

AADT - Average Annual Daily Traffic
SADT - Summer Average Daily Traffic

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

TRAVEL DEMAND AND CAPACITY AT CENTRAL SCREENLINE (AT YONGE STREET)

EXHIBIT 3-5

Year	Roadway												Screenline Total			
	74 - Mulock		31 - Davis		Herald		13 - Mt. Albert		77 - Queensville		Bradford Bypass				AADT/Cap.	
	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	Cap.	AADT	w/o Bypass	w/Bypass
1981	18000	N/A	36000	N/A	9000	N/A	16000	N/A	16000	N/A	-	-	95000	N/A	-	-
1991	18000	13730	36000	22370	9000	32000	16000	5390	16000	2120	-	-	95000	46810	.49	-
2011	36000	30600	36000	43500	36000	17650	32000	6270	16000	3450	72000	39900	228000	141400	0.91	0.62
2021	36000	37750	36000	39750	36000	23950	32000	13500	16000	10600	72000	58400	228000	184200	1.18	0.81

Notes:

[1] Capacity is coded as peak hour two-way hourly capacity x 12.5(peak hour factor - ratio of highway AADT to peak hour volume)

[2] Future AADT = modelled a.m. peak hour 2-way volume x peak hour factor x truck factor
= 2-way AMPH x 12.5 x 1.1
= 2-way AMPH volume x 11

note: truck factor assumes average of 10% trucks

[3] Future SADT on highways = SADT/AADT ratio (1992) x AADT

[4] Future SADT on freeways = 1.2 x AADT (based on Highway 400 data - see Section 3.1.2)

[5] Traffic volumes from annual report, "Traffic Volumes on Provincial Highways", MTO

AADT - Average Annual Daily Traffic
SADT - Summer Average Daily Traffic

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

TRAVEL DEMAND AND CAPACITY AT EAST SCREENLINE (WEST OF HWY.404)

EXHIBIT 3-6

3.1.2.3 Municipal Plans

In recent years, both York Region and Simcoe County have been transforming from scattered rural towns to major urbanized areas. Highway 400 has been widened and Highway 404 has been planned and built, the concept of the Greater Toronto Area has emerged, freight transport has undergone a major shift from rail to road, and both population and the amount of personal travel has tripled or quadrupled in the York - Simcoe area.

These changes are reflected in the Official Plans of York and Simcoe, both of which have been developed in the mid-1990s at the same time as the current 400 - 404 Link study was underway. Both Plans recognize the Link as a significant element in the future regional transportation network which in turn is intended to support the planned land use, population, economic, and environmental aspirations of the municipality. Reference may be made to Exhibit 3-1 in which population amounting to approximately 500,000 new residents in York and Simcoe alone is being planned for. Given that congestion occurs today on parts of the highway network serving the area, there is no question that improvements will need to be made to the network in order to accommodate increased future demands.

The Regional Municipality of York's Official Plan (approved October 17, 1994) states that it is the policy of Council..."to support the planning, corridor protection and the early construction of...Highway 404 north from Davis Drive with links to Highway 400 and to the Highway 7 / Highway 12 junction" (sec. 6.1.13 (c)).

The Town of East Gwillimbury's Official Plan (1979) pre-dates the current study and as such does not reference a future corridor link between Highway 400 and the extension of Highway 404 nor is there an official position taken by the Town regarding a future freeway link.

The County of Simcoe draft Official Plan (December 19, 1996) also recognizes the "Bradford Bypass" as a multi lane highway linking Highway 400 in Bradford West Gwillimbury with Highway 404 in York Region (sec. 4.9.1.1.).

Bradford West Gwillimbury within Simcoe is updating its Official Plan in 1997, and will recognize the 400 - 404 Link as a major element in the Town's future transportation network.

3.1.2.4 Public Input

While there were many different opinions expressed by members of the public over the course of the study as to the appropriate location for a new east-west roadway, there was widespread agreement with the issues put forth in the problem / opportunity statement, particularly with there being a need for improved east-west road capacity in the study area. Public input is documented in Appendix C.

3.1.2.5 Summary of Need

A clear description of the problem or opportunity provides one element of "need". Thus the need for the study has been established through the description of the transportation problems and opportunities within the Region of York and County of Simcoe.

The analysis of municipal development plans indicated that there will be a continuation of dramatic growth in travel demand which has been characteristic of the study area for the past 25 years. This growth, primarily in commuter travel, will eventually lead to increased congestion on key east-west roadways linking Highway 400 to the future extension of Highway 404. Current approved plans to upgrade regional roads will handle only a fraction of these trips.

The travel demand analysis discussed in Section 3.1.2.2 identified the extent of the long term capacity shortfall for east-west travel in northern York Region. The travel demand analysis indicated that demand will exceed available capacity even accounting for planned improvements such as those in the Highway 9 corridor (refer to Section 3.5.2 for discussion of planned improvements in the Highway 9 corridor).

It should be noted that this "east-west" travel demand is comprised in large part of long distance north-south trips making a crossover between Highway 400 and (extended) Highway 404. These highway trips are a provincial responsibility, and are distinct from locally-generated trips which may use a municipal road to access the provincial network. For this reason the location of a transportation link is not only determined on the basis of where it can serve the highest local demand. The location is related more to the potential network benefits, with local service being a secondary benefit. This is discussed in detail in the next section.

In south-central Ontario, the major provincial highway network has been developed on "cellular" framework. The strategic links between parallel corridors allow optimum mobility for those using the network as well as excellent access to the grid for cars and trucks within each "cell". The subject of the current study is one of the missing elements in the network - an east-west link in northern York Region between parallel Highways 400 and 404.

Finally, while some public conerns emerged over the course of the study regarding the location of a Highway 400-404 Link (somewhere between Highway 407 and Lake Simcoe), there has been widespread agreement that the issues put forth in the problem/opportunity statement are valid and require resolution. **Therefore based on the need and justification of planning for a Highway 400-404 link the Project Team undertook an assessment of available alternatives.**

3.2 Analysis Area for Alternatives to the Undertaking

The area of study was defined by the location(s) of the identified problems, together with the reasonable and possible location(s) for potential solutions. Environmental and engineering constraints were also reflected in the study area definition.

Exhibit 3-7 summarizes the locations of the key problems identified in the Statement of Problem / Opportunity. It is evident that the area of greatest concern is roughly that bounded by Highway 400,

Lake Simcoe, Leslie Street / Woodbine Avenue, and Highway 9. Significant growth is projected in this area and it is also where long distance north-south traffic must "split" to travel around either the east or west side of Lake Simcoe.

It may be possible, however, to address some of the problems within this area by solutions located elsewhere (for example, a highway link which diverts through traffic away from the problem area), but it must be recognized that the farther the possible "solutions" are removed from the problem area, the less likely they are to be effective in resolving the problems.

Exhibit 3-8 shows both the "area of problem / opportunity" and the "analysis area for alternatives to the undertaking". There is no evidence that transportation initiatives beyond the analysis area shown would have a significant effect on the identified problems. A more specific definition of the analysis area is as follows:

West Boundary - Highway 27: based on Highway 400 being the western limit of any physical improvement and the related environmental / traffic effects potentially extending as far west as the Highway 27 corridor.

North Boundary - Highway 89 / Cook's Bay / Ravenshoe Road: based on the Highway 89 Extension EA study (1979/84) which had focused on problems identified in the current study (i.e. road network discontinuity, out-of-way travel around Lake Simcoe, etc.), and on the presence of Lake Simcoe as a distinct physical barrier to any more northerly options.

East Boundary - Kennedy Road: based on a northerly projection of Highway 404 being the interface between the current study and the Highway 404 Extension study, and with related interchange locations and / or environmental and traffic effects potentially extending one concession farther to the east.

South Boundary - Highway 407: based on it being the southernmost major transportation corridor where significant improvements could possibly have a noticeable impact on travel patterns within and through the area of identified problems.

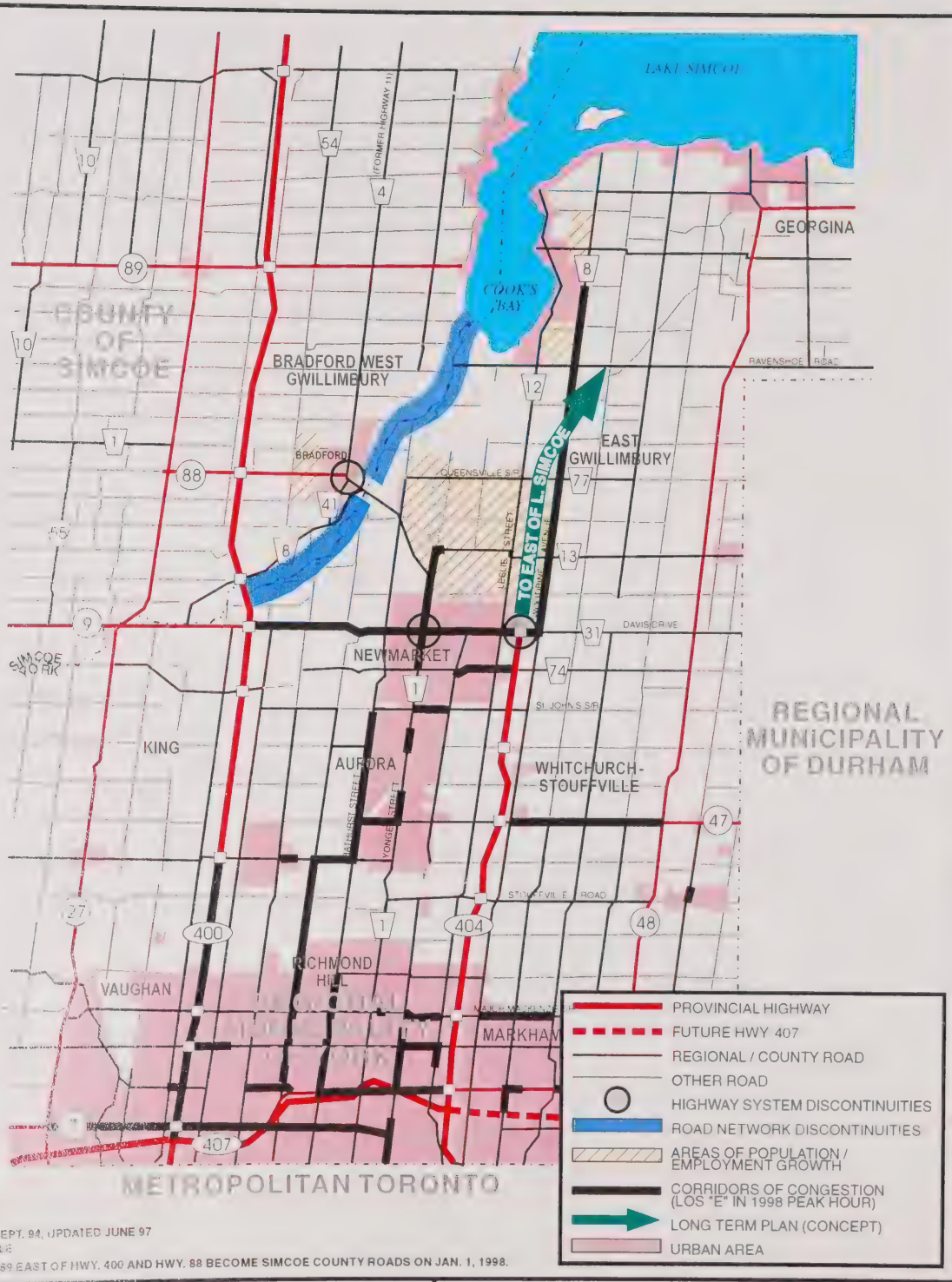
3.3 Rationale, Description and Assessment of Alternatives to the Undertaking

The Environmental Assessment Act requires that a range of alternatives to the undertaking be considered, as well as alternative methods of carrying out the undertaking.

There were four groups of "alternatives to the undertaking" which were initially considered in light of the identification of the problems/opportunities present within the analysis area. These were:

- Do Nothing
- Manage Transportation Demand
- Improve Existing Roadway and/or Roadway based Modes
- Introduce New Non-Roadway based Facilities and / or Non-Roadway based Modes

A description and assessment of each of the alternatives and a summary of their evaluation is discussed in the following sections.

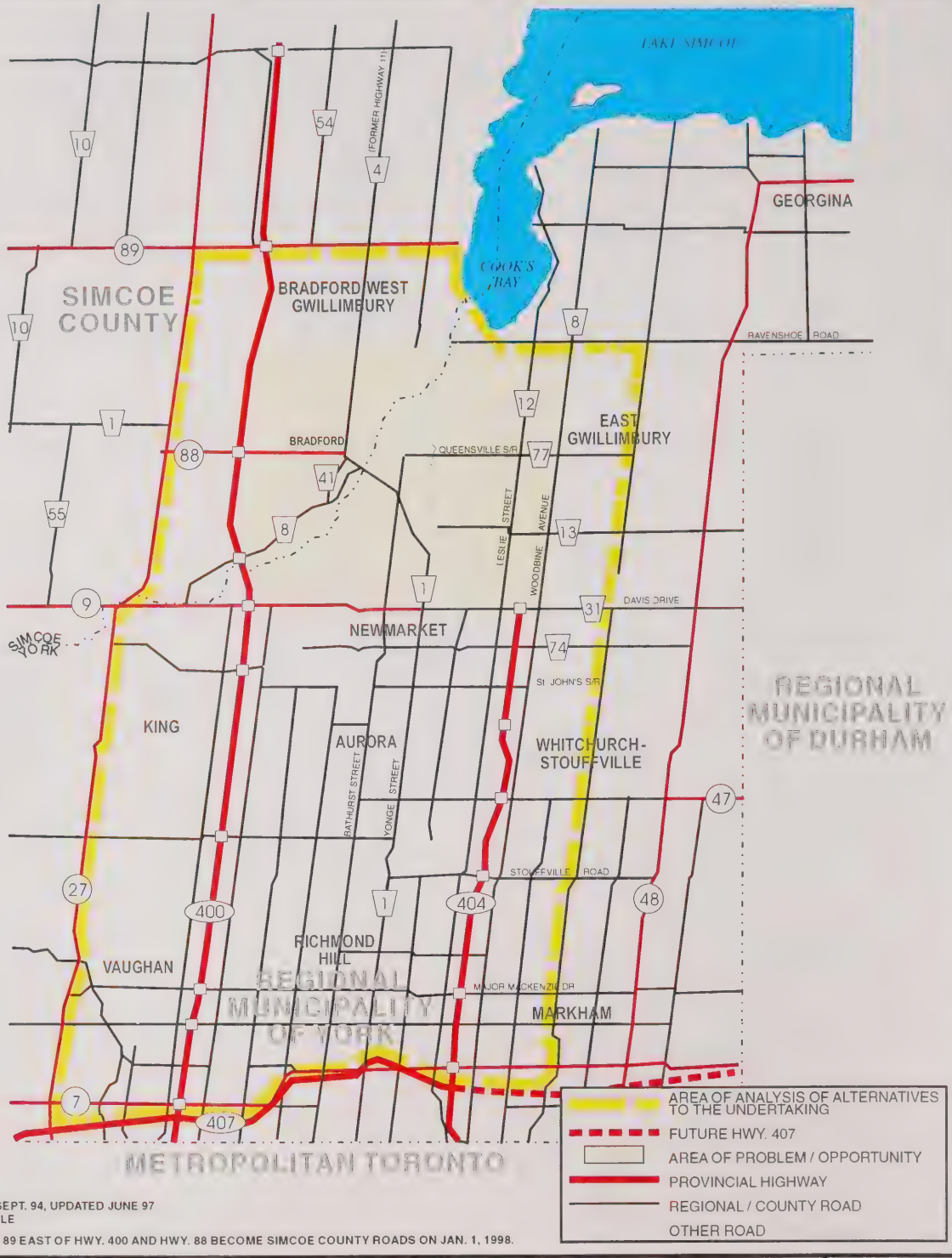


MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE
NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

TRANSPORTATION PROBLEM AREAS

EXHIBIT 3-7



MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE

NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	ANALYSIS AREA FOR ALTERNATIVES TO THE UNDERTAKING	EXHIBIT 3-8

3.3.1 Do Nothing

Description
This alternative (used as a base case for reference purposes) assumes the maintenance of the "status quo" of transportation infrastructure and services (as of 1993), with no significant changes or actions being taken to either manage demand, expand infrastructure, or improve operations.

Assessment
The "Do Nothing" approach is inherently incapable of resolving problems, and can therefore not be actively pursued as a "solution". Since the preliminary screening of alternatives indicated that there were several options which are worthy of being carried forward, there was no point in carrying the "Do Nothing" alternative forward as well. It was therefore set aside but will continue to be referred to as a "base line" through the process of analysis of other alternatives and remains available in the event of all other alternatives being unacceptable.

3.3.2 Manage Transportation Demand

Description
This would include the implementation of measures to reduce, shift, or eliminate transportation demand to the point where there is no longer a need for improved transportation infrastructure / operation within the study area.

There are several ways in which transportation demand can be managed; for example:

- reduce peak hour congestion by ***spreading peak period demand*** over longer periods (e.g. through encouragement of staggered work hours or goods delivery)

- ***shift transportation demand*** patterns to areas where there are fewer transportation infrastructure / operation problems or where better transportation opportunities exist (e.g. encouraging development in target areas, densification, development in nodes around transit lines)

- ***eliminate increases in transportation demand*** (e.g. through caps on development, encouraging telecommuting, etc.)

- directly ***manage the use of the existing transportation system*** so as to maintain demand at a level commensurate with capacity (e.g. through metered access, congestion pricing, etc.)

- ***reduce vehicular demand*** by using fewer vehicles to carry the same (or more) amount of people and goods (e.g. through encouraging transit and High Occupancy Vehicle use and / or discouraging one-occupant vehicle use)

Assessment

The "Manage Demand" group of alternatives is intended to make the best use of the available infrastructure. If the existing infrastructure is capable of accommodating all of the travel demands placed on it, yet is prevented from doing so by operational problems, demand management is a potentially valuable means of bringing demand into sync with capacity. Additionally, the need to provide new infrastructure can be eliminated or deferred in some cases if more efficient use is made of the infrastructure and services already available.

The principles and practice of Demand Management are most applicable to a particular site or controlled corridor. While peak hour travel demand reduction of up to 40% or 50% have been achieved at individual office buildings upon the implementation of a comprehensive Travel Demand Management plan, the best areawide reduction that can be expected is 5 to 10% of peak period auto trips. In an area such as York Region which is growing in population at 2 or 3% per year, it is clear that Demand Management is ineffective as a large-scale congestion reduction technique. Furthermore, for a Demand Management program to be effective, there are several conditions which must be in place: convenient and beneficial alternatives to the single-occupant auto mode; compelling conditions of congestion, lack of parking, or high cost related to single occupant auto travel; relatively dense land use with concentrated employment areas and transit-supportive urban planning; a clearly defined and controllable facility or area; and a commitment from all involved agencies as well as an administrative framework through which Demand Management measures can be implemented and operated. It can be fairly stated that none of these conditions exists in the area under study. Therefore the "Manage Demand" alternative was set aside and not considered further.

3.3.3 Improve Existing Roadways and / or Roadway-Based Modes

Description

The existing system for carrying people and goods within and through the study area consists almost exclusively of roadways and roadway-based modes. Since there are no commercial airports, no east-west rail lines, and no east-west navigable waterways within the area, modes / facilities of these types are dealt with as "new" types in the following Section (d).

In considering roadway options, both facilities and the various modes which use those facilities can be considered as elements of "alternatives" to the undertaking. The existing roadways include provincial highways and various municipal roadways; the modes currently in use include autos, buses, trucks, bicycles, and walking.

The improvement of existing roadways / modes could take the form of:

- ***roadway operational improvements*** - improve the operations of the existing system, for example by using one-way roads, advanced traffic signalling, and electronic traffic management techniques, such that an adequate level of service is offered road users. This incorporates modal operational improvements such as those associated with Intelligent Transportation Systems, as such improvements are integrally related to improvements in the operation of the roadway system itself.

- ***roadway infrastructure improvements*** - through widening, twinning, grade separation, spot improvements, etc., upgrade one or more existing roads in order to expand their capacity and improve operations.

- ***roadway infrastructure addition*** - introduce a new roadway in the study area, thereby adding new capacity to the existing transportation system. Such a roadway could take many forms (freeway, expressway, highway or arterial), would have several alignment options, and have countless design alternatives (structures, intersections, grade separations, cross-section, mitigating features, etc.). Infrastructure options related to other modes currently in use (bicycles, walking) could be introduced as well, including bicycle / foot paths.

- ***new roadway-based modes*** - introduce new roadway-oriented modes, thereby increasing the capacity of the system to move people and goods, and potentially (through new modes such as buses, vanpools, etc.) increase the efficiency of the system.

Assessment

A significant investment has been made in the road system of the analysis area, and it is the foundation of almost all of the urban activity and growth-related planning in the area to date. By improving or expanding the network incrementally, the previous momentum may be built on and the system "fine tuned" in accordance with the demands placed on it.

- ***roadway operational improvements*** represents the capacity-related counterpart of the "Manage Demand" group, and suffers from many of the same drawbacks with respect to the ability to resolve the problems present. No matter how well the existing road network operates, the discontinuities which force out-of-way travel to occur remain. Furthermore, there are physical limitations on the number of vehicles which can pass through signalized intersections that are already constraining operations in congested areas (Davis Drive through Newmarket is one such case).

  On the assumption that existing signal operations in congested parts of the analysis area are already essentially optimized, and not capable of accommodating the growth that will occur in York Region travel demand without further increased congestion. The concession-based roadway grid in the Bradford-Newmarket area is so large in scale and so lacking in intermediate alternative routes that there is little operational or routing flexibility in the existing road system. All vehicles must eventually use or cross the major road grid. Congestion resulting from the conflicts present at each such intersection will be accentuated with continued growth in demand.

  "Roadway Operational Improvements" thus offers an improvement over the "Do Nothing" approach, but faces significant constraints which preclude it from being considered as anything other than an assumed part of the transportation system base case. The alternative was therefore set aside from further consideration.

- ***roadway infrastructure improvements*** increase the capacity of the existing system through widening roads rather than through traffic management. This is the most effective way of providing short term relief in a congested roadway corridor. However, several significant

limitations exist with this strategy. Firstly, discontinuities in the existing road network would remain and the additional lanes provided can quickly be filled by latent demand.

Furthermore, the most congested areas are precisely those which are most sensitive to the impacts of widening (e.g. Holland Street within downtown Bradford, Davis Drive in Newmarket); network discontinuities and the related problems would remain; and, the need to optimize capacity (e.g. by limiting access, controlling all intersections, and adding lanes) conflicts with the local service aspect of arterial roads.

If such widenings were to be restricted to these few locations only, the alternative would not be capable of significantly benefitting long distance traffic, nor would the problems and opportunities be resolved. Although improvements in key areas may work together with the "Roadway Infrastructure Addition" methods to create an effective solution, without the "new link" component, any such plan would not, on its own, be an effective way of addressing the problems and opportunities present. This alternative was therefore be set aside.

- ***roadway infrastructure addition*** - adding new highway or road links to the existing network is another effective means of resolving congestion problems, and is perhaps the most effective of all alternatives in addressing the discontinuity-related transportation problems in the study area. Certain new links (not all) are in accordance with the Regional development plan, and benefits to all sectors of the transportation market (commuters, recreational travellers, goods movement, etc.) can potentially be provided. The cost and potential environmental impacts are drawbacks, but overall there is considerable merit in carrying forward this alternative for closer examination.

- ***new roadway based modes*** - implementing transit improvements such as new bus services is a relevant strategy only if supported by travel demand to the point where they can operate on a cost-effective basis. Although many benefits can be provided, unless transit improvements garner a significant share of the transportation market none of those benefits will materialize. While there is some potential in the Yonge Street corridor for transit improvements, they would be a benefit to few recreational or long distance travellers. The scatter of origins and destinations of long distance provincial traffic now using Highways 400 and 404, as well as the low density of most development in the northern part of York Region are not conditions which support extensive transit use. This is evident by the Region's current low transit modal share.

  Without considerable changes in land use patterns (which are not realistic in the short term) and additional infrastructure (priority lanes, transitways, new roadways), new roadway-based modes will be limited in application to areas which will have no significant impact on resolving the identified problems and opportunities. The alternative was therefore not considered a reasonable one to pursue further in resolving the problems and opportunities present.

3.3.4 Introduce New Non-Roadway Based Facilities and / or Non-Roadway Based Modes

Description

Those facility or mode types that are not present in the study area may be introduced in order to expand the capacity of the transportation system, offer a new choice to the user, and contribute to the resolution of the stated problems and opportunities. As outlined in previous section (c), "new" modes would be air, rail, or water-based, and would require the associated infrastructure such as airports, railways, and lake / river / canal systems respectively. The "new" rail alternative could be further subdivided into interurban passenger rail (VIA, GO trains), intra-urban passenger rail (Subway, Light Rail (LRT)), and freight rail (CN, CP).

In the context of the EA Act's definitions of "alternatives to" and "alternative methods", a roadway intended for exclusive use by buses (i.e. Busway / Transitway) would also be considered a "new facility type" in the study area.

It should be noted that the existing rail service in the area is limited to a few selected points; it is not considered a "reasonable" existing alternative with respect to east-west travel needs and will be considered a "new facility" for the purposes of the current study.

Assessment

Non-roadway based modes can contribute to addressing the travel needs of small sectors of the marketplace but are incapable of accommodating the diversity of trip types, directions, and modes with the convenience and cost-effectiveness of roadway-based modes. In the case of travel by air or water, the potential impact on the resolution of problems in the study area is negligible.

The only conceivable relevant alternative would be a ferry service across Cook's Bay as an alternative to a road route around the body of water. However, the change in mode required and the comparatively low travel speed would not produce a time savings and hence would not attract travellers to the degree that would produce a significant contribution to roadway congestion relief.

Regarding air travel, it is already available as an alternative for long distance trips through the area. It is not, however, a reasonable mode for commuter use and can be readily set aside on that basis.

The various rail modes, unless they involve new trackage, are captive to the same market forces that were described in the "new Roadway-Based Mode" analysis. Inter-urban passenger travel is served by VIA Rail and GO Transit today, and those modes capture a significant portion of commuter trips destined to central Toronto but to nowhere else. It is not a competitive mode in terms of travel time and convenience for east-west trips within the study area, nor is it attractive for most trips to the study area. The market niche for inter-urban passenger rail is thus too small to have a significant impact, even if fully exploited, on the problems at hand and was therefore set aside.

Freight rail enhancement could reverse a long trend towards road-based freight movement, however trucking is the principle transport mode in the analysis area for internal and internal/external traffic. Within an analysis area of this study's size trucking dominates over rail, largely because:

- flexibility of service, including door-to-door delivery;
- lower transit times and material handling costs;
- generally lower damage costs; and
- the preference for "just in time" delivery over maintaining large stockpiles of materials.

In addition, trucking is not a significant contribution to peak period congestion in the study area and it is relied on as a mode to service most of the new industrial and agricultural areas in any case. This alternative does not address the structural basis for the identified transportation problems, nor does it create or take advantage of relevant opportunities and should not be pursued further. It may be noted that CN Rail has filed for the abandonment of the rail line north of Bradford. This is a clear indicator of freight rail's lack of competitiveness in this market.

The two remaining alternatives, Intra-Urban Passenger Rail and Bus-only Roadway (Busway) are essentially identical in function, purpose, and impact. While they exhibit potential in densely-populated corridors and transit spines such as Yonge Street and Highway 407 (per York Region's Official Plan), they do not reflect the market needs in the area currently under study. There must be a commonality of origins and destinations, marked by a build-up of conventional transit service, before the investment in a fixed transit infrastructure is warranted. The lack of transit service in the study area indicates that this is an unlikely prospect in any reasonable time frame. If "new Roadway-Based Modes" is not considered a reasonable and effective alternative due to the market situation present, then a more intense transit-oriented strategy represented by the Light Rail and Busway alternatives is even less appropriate.

3.3.5 Summary Evaluation of Alternatives to the Undertaking

The preceding discussion in this section presents the rationale for either carrying forward or setting aside the various "alternatives to the undertaking" which had been identified for the purposes of considering alternatives.

The only alternative to the undertaking determined to be reasonable to carry forward for more detailed study is ***roadway infrastructure addition*** as it would make a significant contribution towards addressing the problems/opportunities identified (either on its own or in combination with another alternative). The remaining alternatives do not exhibit the potential to contribute significantly to the resolution of the identified problems/opportunities, and are therefore recommended to be set aside at this stage and not pursued further.

Since ***roadway infrastructure addition*** is an essential element in all reasonable possible strategies, there was no need at this stage to carry forward any other alternatives in combination such as "roadway infrastructure improvements". As the "roadway infrastructure addition" alternative is carried forward to be developed and analyzed in greater detail in subsequent portions of the study, the ability to support or enhance its effectiveness by incorporating elements of other alternatives (for example, HOV lanes) may be considered as appropriate. The ultimate recommendation could therefore potentially incorporate several alternative elements in addition to the "basic" alternatives carried forward. Furthermore, if the alternative is not found to constitute a "solution" with an acceptable net environmental impact, there would be no basis upon which to pursue any of the other alternatives.

3.4 Rationale and Description of Alternative Methods of Carrying Out the Undertaking

The previous section provided a basis for considering new roadways as a reasonable alternative to address the problems and opportunities present in the study area. The next step is to determine a set of reasonable "alternative methods" which represent the preferred "alternative to the undertaking". In other words, given the desirability of a new roadway solution, what alternative roadway types and locations should be considered?

For planning purposes, protection of a right-of-way which will accommodate the long term foreseeable traffic demand (i.e. 2021) in a safe and efficient manner is prudent. This is to avoid a situation whereby (for example) a two-lane highway is built and surrounded by development, which generates the need for highway expansion while at the same time making it impossible.

Defining the type of new roadway for which property should be protected depends fundamentally on the amount of vehicular demand it will be expected to accommodate. The current study has a long time horizon (to the year 2021 and beyond) in order to fully reflect the land use, population, and travel demand growth which is anticipated. On that basis, the travel demand analysis summarized in Section 3.1.2.2 demonstrated that a two lane highway would be inadequate to accommodate the traffic volumes forecast in the long term for traffic crossing between Highways 400 and 404, and that the need exists to protect for a four-lane roadway. Details of the Travel Demand Modelling may be found in Appendix A.

In order for a four-lane roadway to operate safely and efficiently, a basic design principle is to restrict, control, or eliminate entrances and intersections. Furthermore, the highest standards of safety, operation and capacity can only be met through grade separation with crossing roads, access via free-flow interchanges, and separation of opposing traffic streams.

The provision of these operational design features usually involves a greater impact on the environment than would a simple two- or four-lane roadway with at-grade intersections. This is due to the additional property requirements and interchange needs. Therefore, planning on the basis of a freeway represents both a conservative plan in which the full extent of the facility's impact can be assessed and a prudent planning approach which allows the flexibility for staged implementation.

Therefore, on the basis of travel demand, safety, and protection of adequate property to reflect the full impact of the roadway, **planning for a new route should be on the basis of protecting for the ability to implement a four-lane freeway**. Consideration will be given to the potential to implement the freeway in a staged manner (for example, constructing a two lane roadway within the freeway right-of-way initially and twinning it to form a fully controlled access freeway in later years in accordance with demand growth and funding availability).

3.5 Rationale for Study Area Boundaries

Within the broad analysis area there is possibly more than one corridor that could reasonably contain a freeway type facility between Highway 400 and Highway 404 capable of addressing the identified problems/opportunities. In order to narrow the scope of the investigation, a corridor analysis and evaluation was carried out to determine the preferred corridor within which to investigate corridor alternatives. The process followed was to:

1. Generate Corridor Alternatives (Section 3.5.1)
2. Analyse and Evaluate Corridor Alternatives (Section 3.5.2)
3. Define Recommended Study Area for Route Alternatives (Section 3.5.3)

The following discussion details the process which identified the study area boundaries.

3.5.1 Generation of Corridor Alternatives for New Roadway

The generation of new road alternatives of the freeway type must be based on the existing freeway network. Highways 400 and 404 currently provide north-south routes, however, there is no ability to travel east-west or to travel between these corridors in the study area without using arterial roads. It is these same trips which are most affected by the barrier created by the Holland River.

Past studies have identified and in some cases thoroughly examined essentially all of the potential east-west corridors between Lake Simcoe and the southern boundary of York Region. It should be noted that although these past studies may have had different objectives, their scopes included areas which overlap the current analysis area. As such, some of the previous findings may be useful in this study.

Relevant source studies which have identified possible east-west corridors in this area include:

a) Highway 89 Extension EA Studies (MTO, 1979, 1984)

These EA reports dealt with a highway concept immediately south of Cook's Bay which would eliminate a major gap in the road network. The EA submission for the recommended route was later withdrawn by MTO due to environmental concerns.

b) Highway 404/89 Overview (MTO, Nov. 1989)

This network study recommended the extension of Highway 404 north along the east side of Lake Simcoe, with a link to Highway 400 south of Cook's Bay (see Section 3.1.2.1).

c) Corridor Protection Study Part I: East-West Corridor (MTO, June 1992) (unpublished)

The conceptual viability and need for a third-tier (after Highway 401 and Highway 407) bypass of the urban Toronto area and a link between Peel and Durham regions for east-west traffic was assessed. Possible corridors for such a facility were identified north of Highway 407 and south of Highway 9.

d) Highway 11 Study for Provincial Highway Transfer (York Region, March 1993)

Improvements in the Green Lane corridor were proposed as a relief to Davis Drive congestion.

e) Green Lane Corridor Environmental Study Report (York Region, October 1996)

Based on (d), plans were developed for a Newmarket Bypass in the Green Lane corridor, connecting Highway 9 at Bathurst Street to the future extension of Highway 404 north of the town boundary with a high capacity arterial.

The specific alternative routes identified in each of the above studies are shown together on Exhibit 3-9.

It is recognized that each of these studies had their own purposes and were carried out independently and at different times. However, all of them considered the opportunities to improve east-west travel within the area bounded on the west by Highway 400 and on the east by the future extension of Highway 404.

Each of these studies recognized the constraints placed on development of such a new facility by the existing land form and development pattern, and in every case alternatives were developed with the intent of achieving functional goals while having an acceptable impact on the environment. In this respect, Exhibit 3-10 provides an overview of the key factors affecting the identification of viable alternative new highway corridors, including both urbanized areas and sensitive or protected natural environmental areas.

When the alternatives of Exhibit 3-9 were compared with the constraints shown in Exhibit 3-10, it was readily apparent that the previous alternatives represented a comprehensive set of realistic options and that no potentially reasonable corridor for a new east-west highway has been excluded. With this background, there was no need to generate additional "new corridor alternatives", nor did any new corridor concepts arise through the consultation process for the study. As well, although several of the routes had been studied and rejected for various reasons in the past, for the purposes of providing a comprehensive, traceable decision-making process the current work brought together all identified alternatives on a common footing so that they could be compared and assessed with respect to the problems and opprtunities at issue.

Therefore, the available corridors for considering new roadway alternatives were:

- between Richmond Hill and Aurora in the southern part of the Oak Ridges Moraine;
- between Aurora and Newmarket, roughly in the vicinity of St. John's Sideroad;
- the Bradford corridor north of the Highway 88 / Queensville Sideroad corridor but skirting the southern edge of the Holland Marsh;
- the Highway 9 / Green Lane / Herald Road corridor skirting the northern edge of Newmarket; and
- the proposed "Highway 89" route immediately south of Cook's Bay, connecting to Ravenshoe Road.

These corridors are shown on Exhibit 3-11. Each corridor could be considered to represent any number of specific alignment alternatives.

3.5.2 Analysis of Corridor Alternatives

This section describes the two-step process used to first define, then confirm, the location of the study area within which alternative routes are to be developed. A broad screening of all available corridors was followed by a more focused comparison between different options in the Newmarket and Bradford corridors.

The analysis of corridor alternatives was carried out at an overview level using mapping with a scale of 1:50,000. The steps taken were to:

- carry out an initial screening to determine if all of the alternatives could reasonably address the problems and opportunities present, then
- do an overview-level comparison of the reasonable corridor alternatives, then to
- complete the analysis with a more detailed comparison of the final corridor options.

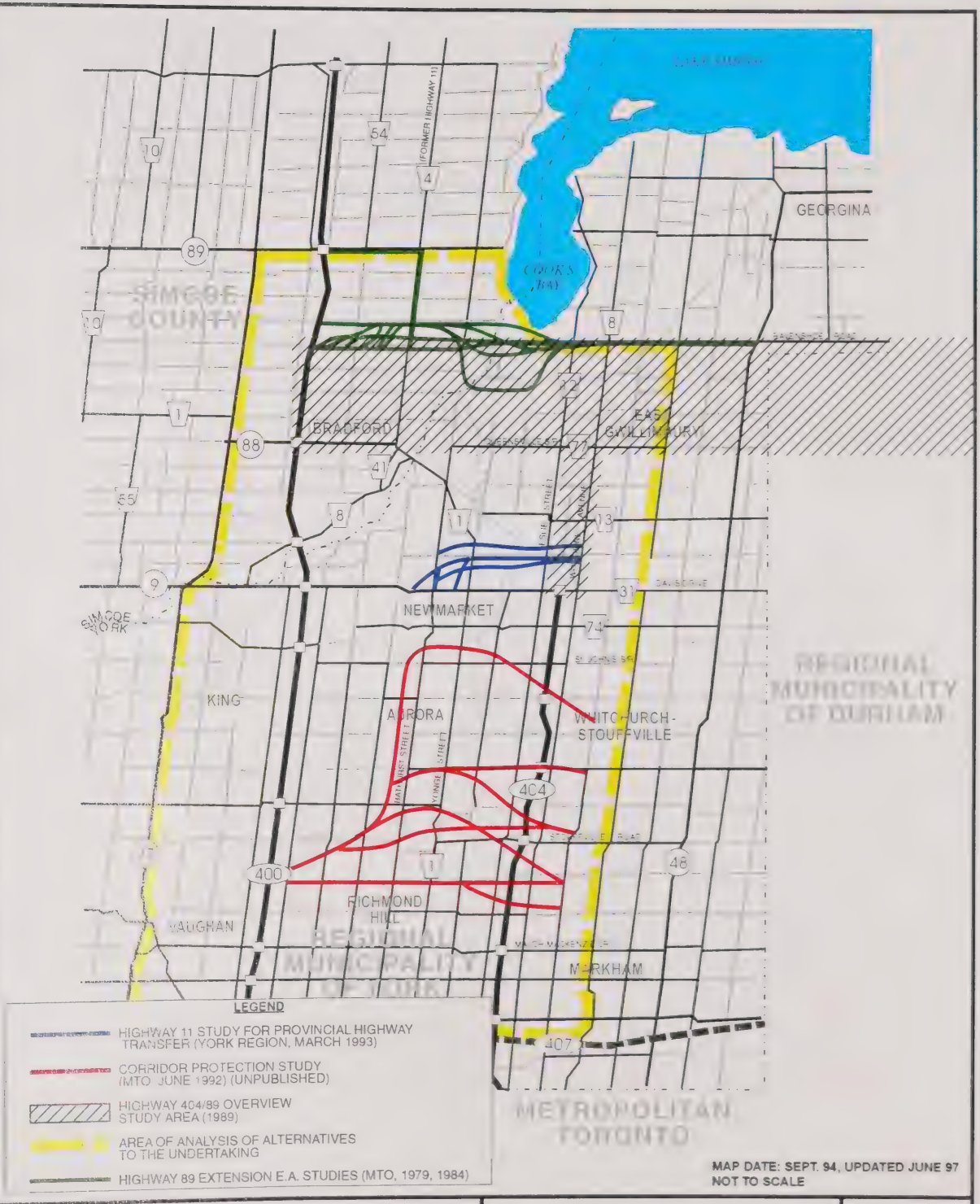
a) Initial Screening of Alternative Corridors

(i) Rationale for Setting Aside the Highway 89 -Ravenshoe Road Corridor

Of the five corridors identified in the previous section, not all were necessarily appropriate to carry forward through the detailed analysis and evaluation process. In particular, the Highway 89 - Ravenshoe Road corridor has a history associated with it that effectively precluded it being considered as a "reasonable" alternative.

Essentially, concern over the extent and significance of the impact of the recommended Highway 89 Extension plan on the natural environment as it crossed Keswick Marsh (immediately south of Cook's Bay) led to it being withdrawn from the EA process by the Ministry of Transportation in 1986. Although the plan was the product of extensive design development, consultation and technical work, the concerns remaining with the final proposal were significant enough that a commitment was made by the Minister of Transportation at the time of withdrawal to not consider any new highway routes through the Marsh area in the future. This principle, and the impact associated with a highway crossing, remains in place today.

Furthermore, the Highway 89 proposal was for a new two lane arterial highway west of Leslie Street and for the utilization of existing Ravenshoe Road to the east; the extension of Highway 404 was not contemplated at that time. The original proposal is thus not compatible with a freeway-type facility currently being considered, and an entirely new alignment would need to be developed which would necessarily have a greater impact on both the Marsh and the surrounding agricultural lands than would the two lane arterial contemplated in the earlier study.

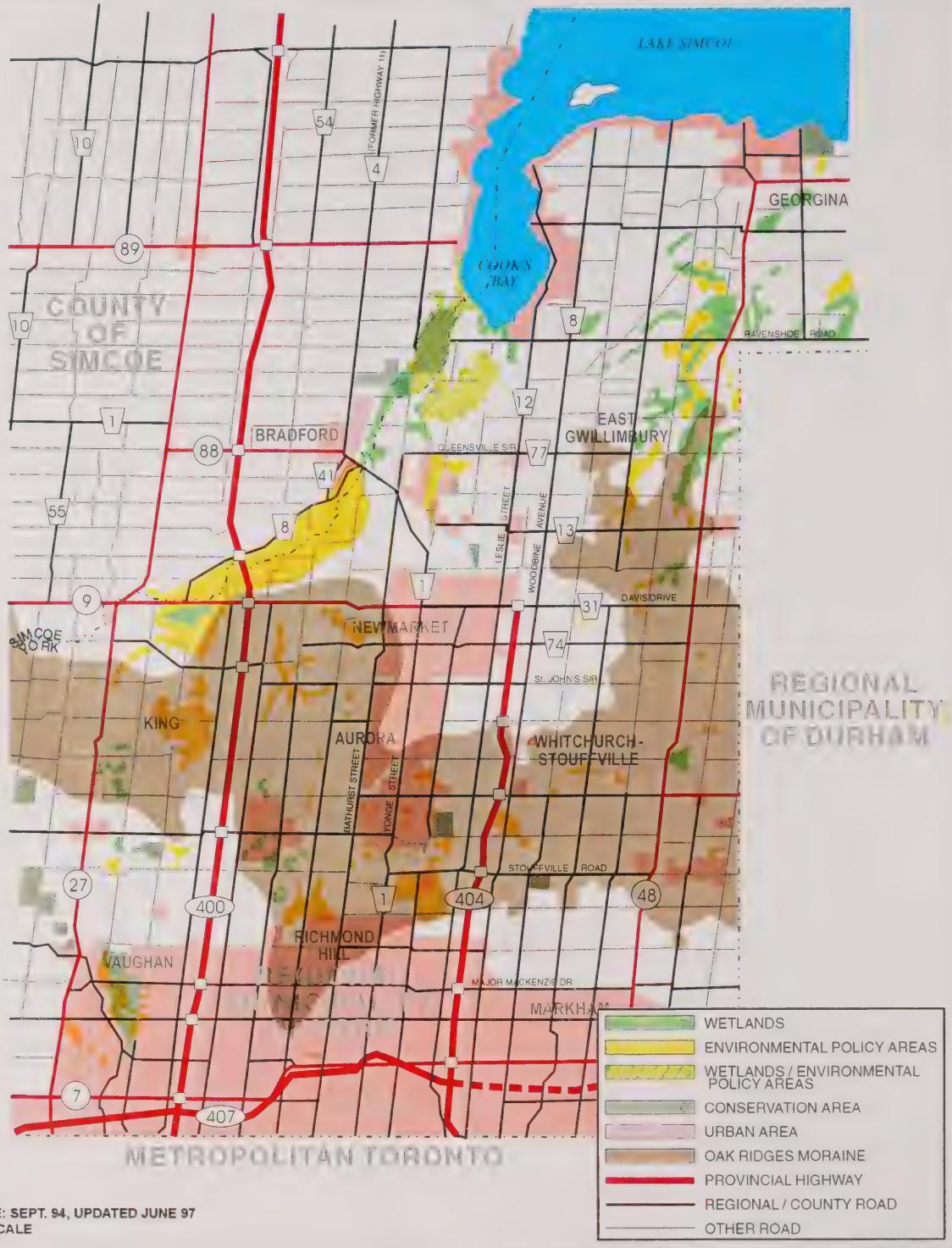


MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

ALTERNATIVE ROADWAY ALIGNMENTS PREVIOUSLY STUDIED IN YORK REGION

EXHIBIT 3-9



MAP DATE: SEPT. 94, UPDATED JUNE 97
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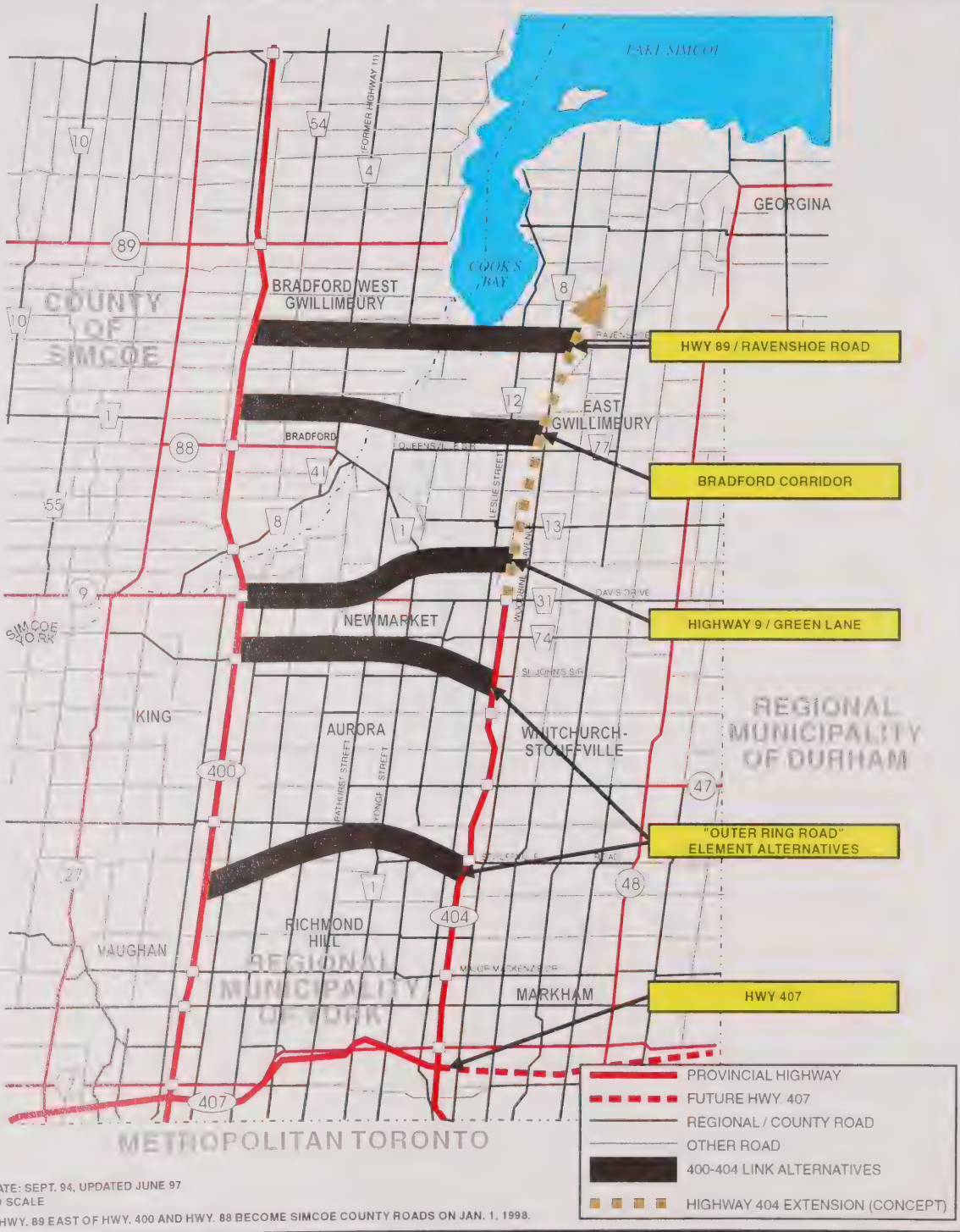
HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	CONSTRAINTS TO CORRIDOR ALTERNATIVES	EXHIBIT 3-10



MAP DATE: SEPT. 94, UPDATED JUNE 97
NOT TO SCALE

NOTE: HWY. 89 EAST OF HWY. 400 AND HWY. 88 BECOME SIMCOE COUNTY ROADS ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	CORRIDORS	EXHIBIT 3-11

The Environmental Assessment Proposal provides more detail of the significant environmental constraints on a new roadway in the portion of the Highway 89 / Ravenshoe corridor west of Woodbine Avenue, specifically as compared with the equivalent Bradford corridor. Overall, a roadway in the 89 / Ravenshoe Corridor has a significant overall environmental impact due to its proposed location in the core of the Keswick Marsh wetland complex. For almost all factors considered, it has greater constraints than the Bradford corridor which is located at the southern periphery of the large natural area. The more southerly location reduces the loss of wetland area and function and the potential fragmentation of wildlife habitat.

In summary, it was unreasonable to pursue a new roadway in the Highway 89 / Ravenshoe corridor, while the Bradford corridor offered less natural environmental constraints (although affects more people) and remained a viable option warranting more detailed analysis.

Of the remaining corridors, the Highway 9 / Green Lane corridor was singled out as a unique case. At the time the analysis of corridor alternatives was carried out (1994), as documented in the EAP, it was recognized that the Highway 9 / Green Lane concept was fundamentally different from the other freeway-based corridor alternatives in that it had not been conceived in the earlier studies as a freeway corridor. Nor was the concept suited to that approach without considering an entirely new alignment over the whole route. Nevertheless, the corridor was capable of supporting a high-capacity, high-speed arterial highway, and had been identified by York Region and the Town of Newmarket as a high priority initiative

In the EAP, therefore, the Highway 9 / Green Lane alternative was analysed together with the other three "new freeway" corridors, but was evaluated separately with reference to its role as a high standard arterial, not as a freeway. Subsequent to the publication of the EAP and with the development of specific route alternatives in the Bradford corridor, some concerned Bradford corridor residents challenged the rationale for setting aside the more southerly routes and, more specifically, promoted use of an improved Highway 9/Green Lane corridor instead of the Bradford route.The residents'view was that the need for a new roadway across the Holland River in the area of River Drive Park would be eliminated if improvements were made in the Highway 9/Green Lane corridor instead.

Consequently, a more detailed examination of freeway and arterial alternatives in the Highway 9/Green Lane corridor was undertaken. These alternatives were then compared to equivalent alternatives in the Bradford area (see the next Section). This more detailed work superseded the EAP overview-level analysis and was the focus of a specific public involvement program. The detailed work was published in 1995 as "Comparison of Alternative Routes Within Newmarket Corridor and Bradford Corridor ", and is included here as Appendix B.

(ii) Comparison of Corridor Alternatives

The four alternative corridors remaining after the screening were subject to an analysis which was carried out at an overview level of detail. A broad "representative" route alignment was shown for each alternative on 1:50,000 scale base mapping, and the analysis was carried out using mainly secondary source material, supplemented in some cases by reconnaissance and field review. Note

that the three freeway options are discussed first, followed by an assessment of the Highway 9 - Green Lane option.

Exhibit 3-12 shows a graphic representation of the "good-fair-poor" comparative ratings. The rating criteria are defined in Exhibit 19 of the EAP. Exhibit 3-12 is only intended to provide a "quick overview" of the analysis; a summary evaluation of the alternatives follows.

The evaluation of alternative corridors for a new high standard roadway between Highways 400 and 404 utilized the analysis factors:

- Transportation
- Natural Environment
- Social Environment
- Economic Environment
- Cultural Environment
- Applied Environmental Conditions

Under the **Transportation** factor, the key advantage of the Bradford corridor over the two freeway alternatives south of Newmarket is its relative location within the provincial highway network. Because demand for travel between Highways 400 and 404 is consistent in size no matter where it occurs, then it is better served in the Bradford location because a cell-like "box" can be formed around the intensively-developed Yonge Street spine whereby all trips oriented to and through the cell can be distributed flexibly and evenly via the Bradford corridor, 400, 407 and 404. Any east-west link further south than Bradford would leave the north side of the "box" open and would therefore not address the bulk of the Problems and Opportunities present (as defined in Section 3.1.1).

A freeway in the Bradford corridor could relieve downtown Bradford of most east-west through traffic (estimated as 30% of the total 2011 a.m. peak hour demand at the Highway 88 / Highway 11 intersection). By drawing long-distance traffic away from the slower-moving arterial road network, it would also relieve a similar proportion of the through traffic demand on Davis Drive in Newmarket and would allow Yonge Street north of Newmarket to revert to its role as a municipal arterial serving local motorists and fronting businesses.

The South Oak Ridges alternative is too close to Highway 407 to make a significant additional contribution to resolving the specified transportation problems in the analysis area, and it would consequently not merit the negative impact it would have on the Oak Ridges Moraine and communities in the area.

The Aurora / Newmarket corridor has the potential to perform a better transportation function than South Oak Ridges, as it is beyond the direct influence of Highway 407 and in the heart of a populated area. It would serve a slightly different market than the Bradford corridor: the "round lake Simcoe" trips via Highways 88, 9 and 11 would not use the route, while the greater number of long distance trips originating in the more heavily populated area south of Highway 9 would find this 400 - 404 link attractive. The net result is that both the Aurora-Newmarket and Bradford routes would serve similar volumes of long distance traffic. However, the Bradford corridor would serve all of

the "round the lake" trips plus the same volume of longer trips, while long distance trips from south of Highway 9 would, in the absence of an Aurora / Newmarket route, still have Highway 407 and the Bradford route to use between 400 and 404. In terms of addressing the problems and opportunities identified in Section 3.1.1, the Aurora/Newmarket corridor fails to respond to the need for road network improvements north of the Highway 11 Holland River crossing, and consequently does not fully relieve Bradford and Newmarket of the impact of long distance provincial trips on the municipal street system and community.

The larger number of locally-oriented trips served by the Aurora / Newmarket corridor may be discounted in terms of supporting the need and justification for the provincial highway route, since an adequate municipal road network is available for the distribution of local trips in those areas with connections to Highways 400 and 404.

The southern alternatives ("South Oak Ridges" and Aurora/Newmarket") also face major natural and social environmental constraints. Constraints with the natural environment relate to potential impacts to features of the moraine and also to the Oak Ridges Moraine planning policy which limits the type and extent of development. The social environmental constraints primarily relate to the proximity of extensive residential areas which physically limit the possible locations of new facilities and can have serious social implications (noise impacts, lifestyle impacts, diminished property values, etc.). The Bradford corridor involves a crossing of the Holland River and agricultural land, but by avoiding the Holland Marsh and by skirting the town of Bradford, such a route could accommodate a new freeway with acceptable and mitigatible natural and social environmental effects. Of the three alternative corridors, the Bradford one would have the least net impact on provincially significant environmental features.

Upon consideration of all of the evaluation factors and comparison of the three alternative freeway corridors in terms of effectively addressing the statement of problem / opportunity, the Bradford corridor was determined to perform the strongest transportation function of the three, have the least net impact on the natural and social environment, and most effectively resolve the identified problems. It was therefore considered the preferred corridor of the three in which to develop a high standard highway link between Highway 400 and (extended) Highway 404.

The above discussion does not address the Highway 9 - Green Lane corridor, since the latter, as an arterial roadway upgraded from existing roads, is a functionally different facility than the "greenfield" new freeway concepts considered in the other corridors. As an arterial roadway located largely within an established road right-of-way, the Highway 9 - Green Lane option had inherent advantages under several comparative factors. However, it did not fully address the transportation problems present and actually made some things worse. It does not resolve any discontinuity problems because it maintains the existing road grid; it is inadequate to accommodate the future travel demand (in the absence of any other new east-west route in the area), and improvements on Green Lane would actually draw more, not less, traffic through downtown Bradford, since the 88-11-Green Lane routing would become the most direct available link between Highway 400 and Highway 404 for many travellers.

While, as documented in the EAP, the Highway 9 - Green Lane corridor was set aside as an arterial option at the time of the initial corridor comparison, more detailed analytic work was subsequently

FACTOR / CRITERION		RATING			
		SOUTH OAK RIDGES	AURORA / NEWMARKET	HIGHWAY 9 - GREEN LANE	BRADFORD
1.	**TRANSPORTATION**				
1.1	Traffic Operating Speed	●	●	●	●
1.2	Traffic Volume	●	●	·	●
1.3	Traffic Operations	●	●	●	●
1.4	Safety	●	●	·	●
1.5	Efficiency	●	●	●	●
1.6	Network Aspects	·	·	●	●
1.7	Financial	·	·	●	·
1.8	Construction	●	●	●	●
1.9	Staging	·	●	●	·
2.	**NATURAL ENVIRONMENT**				
2.1	Fisheries and Aquatic Habitat	●	·	●	●
2.2	Wildlife	●	●	●	·
2.3	Vegetation	·	●	●	·
2.4	Wetlands	·	●	●	·
2.5	Groundwater	·	·	●	●
2.6	Surface Water	●	●	●	·
2.7	Greenways and Open Space Linkages	·	·	●	●
2.8	Soil	●	●	●	·

FACTOR / CRITERION		RATING			
		SOUTH OAK RIDGES	AURORA / NEWMARKET	HIGHWAY 9 - GREEN LANE	BRADFORD
3.	**SOCIAL ENVIRONMENT**				
3.1	Aesthetics	●	•	•	●
3.2	Highway and Construction Noise	•	•	•	●
3.3	Community / Recreation	●	•	•	●
4.	**ECONOMIC ENVIRONMENT**				
4.1	Agriculture	●	●	●	•
4.2	Commercial / Industrial	•	•	●	●
4.3	Special Land Use Strategies	●	●	●	●
4.4	Property Waste and Contamination	-	-	-	-
4.5	Aggregates	•	●	●	●
5.	**CULTURAL ENVIRONMENT**				
5.1	Archaeology	-	-	-	-
5.2	Historical	-	-	-	-
6.	**APPLIED ENVIRONMENTAL CONDITIONS**				
6.1	Stormwater Management	●	•	●	●
6.2	Erosion and Sedimentation Control	•	●	●	•
6.3	Sustainable Development	●	●	●	●

● Good / Most Preferred

● Fair

• Poor / Least Preferred

COMPARISON OF ALTERNATIVE FREEWAY CORRIDORS

EXHIBIT 3-12

carried out (including the development of freeway concepts in the Highway 9 - Green Lane corridor) which allowed a direct comparison to be made between it and the Bradford corridor. This work is documented in the following Section.

b) Comparison of Highway 9 - Green Lane (Newmarket) Corridor and Bradford Corridor

Upon review of the EAP, suggestions were made by the public and interest groups that, rather than being treated as an arterial alternative, the Highway 9 - Green Lane route could be upgraded to achieve an effect similar to that of a freeway in the Bradford carridor in terms of improvement in east-west transportation service, thereby eliminating the need for the latter. The more detailed comparison is documented in Appendix B and is summarized below.

As noted in Section 3.5.1 (e), plans are already in place or underway for the upgrading of Highway 9 and of Green Lane and the linkage of the two to form a continuous basic four lane high-standard arterial roadway extending from Highway 400 to a northerly extension of Highway 404. These plans are anticipated to be realized within the next five to ten years and were included as such in the travel demand modelling which revealed the future road capacity shortfall. The continuous Highway 9 - Green Lane link therefore forms a "base case" over and above which long term travel demand needs as defined in Section 3.1 remain.

To fully address all of the options put forward by the public, both an upgrade of the existing Highway 9 - Green Lane route to freeway standards and the development of an entirely new freeway alignment parallel to the route were considered. The upgrading concept of the existing Highway 9 - Green Lane route included a link between the two in the vicinity of Bathurst Street. At the time of analysis, several alternatives for such a link were under consideration. For the purposes of the corridor comparison work, it was assumed that the route shown in the Northwest Newmarket Secondary Plan was the most reasonable concept to use. The subsequent decision by York Region to use Bathurst Street itself as the link does not affect the corridor comparison conclusions since any continuous freeway link would have to follow a new, curvilinear alignment through the area.

For a representative new alignment, major environmental constraints such as the Oak Ridges Moraine, Holland Marsh farming area, and Glenville Kame and the developed part of Newmarket were taken into consideration. As shown on the following Exhibit 3-13, the latter constraint put a new route to the north of existing Highway 9 and Green Lane. The exhibit also shows the route which best represented the concept of a new road in the Bradford Corridor, as developed in an earlier phase of this study.

Transforming the existing Highway 9 - Green Lane route to a controlled access fully divided freeway would require that two-way service roads be provided on each side of Highway 9 between Highway 400 and Bathurst Street in order to maintain access to all of the properties which front on the highway and would otherwise have no access. There are fewer fronting properties on the Green Lane segment of the route, but the need for property access and local movement would dictate that a parallel arterial road system be put in place on both sides of the freeway there as well. Thus a freeway in the Highway 9 - Green Lane corridor would, for the most part, be in addition to the currently planned upgrading of the route to four lane arterial standards, not as a replacement.

Considering the fact that any right-of-way protected as a result of this study will essentially be the maximum property available in perpetuity (not just to the 2021 planning horizon), and that travel demand forecasts to 2021 indicate volumes nearing the limit of four lane arterial capacity, the position was taken for the purposes of this analysis that a freeway right-of-way should be protected for, whether or not its construction is staged as an initial two lane highway, a four lane arterial, a divided highway, or a fully controlled access freeway. An arterial would therefore simply be a potential staging option of an ultimate freewayAlternative.

There were therefore three different alignments to be analyzed:

1) Green Lane: Upgrade Highway 9 and Green Lane to 4 lanes and link the two near Bathurst Street (base case - to be implemented within 5-10 years); and at some point in the future reconstruct the route to freeway standards, including service roads west of Bathurst Street.

2) Newmarket: Upgrade Highway 9 and Green Lane to 4 lanes in the near term (per Alternative 1), plus build a new four lane freeway on a new alignment north of Highway 9.

3) Bradford: Upgrade Highway 9 and Green Lane to 4 lanes in the near term (per Alternative 1), plus build a new four lane controlled access freeway on a new alignment north of Bradford.

The three alignment alternatives are shown in Exhibit 3-13.

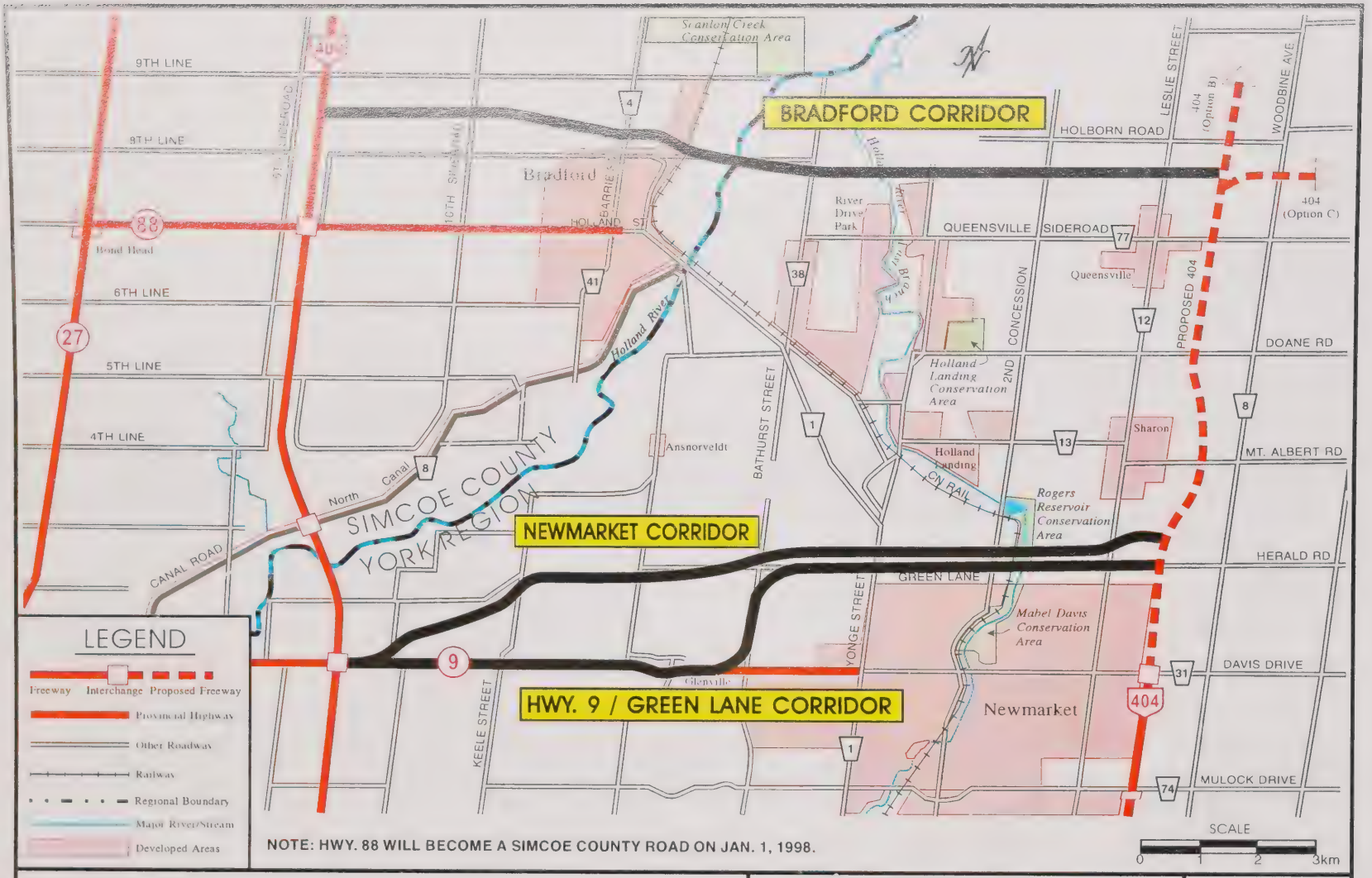
(ii) Comparison of Freeway Alternatives

This section focuses on the three "new freeway" Alternatives, using their key differences as summarized in Exhibit 3-14 to frame the evaluation.

Traffic Volume (Criterion 1.2)

A traffic assignment using the EMME/2 regional computer traffic model was carried out for each alternative. Using common land use and trip generation assumptions, the results indicated that a new freeway in either the Bradford or Newmarket Corridors would carry substantial traffic volumes, and that the overall long range demand for long distance travel in either corridor would be of the same order of magnitude.

One significant difference is in the distribution of the trips among the various roads available; in the model, the Newmarket Corridor options were assigned greater volumes than the Bradford alternative in large part because many of the trips on the Newmarket Corridor freeway are those that would otherwise have been assigned to existing Highway 9 - Green Lane. Another difference between the Newmarket and Bradford corridor demand is in trips destined to or originating from the immediate area (Newmarket, Holland Landing, East Gwillimbury) served by the Newmarket corridor and which now use the municipal road network; under Alternative 6 the model indicates that those trips would remain in the Newmarket area, using other roads such as Highway 9 - Green Lane and Highway 11. The Bradford Corridor, because of the lesser number of employment-destined trips in its immediate service area, has fewer "local" trips and accommodates long distance trips almost exclusively.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

NEWMARKET AND BRADFORD CORRIDOR ALTERNATIVES

EXHIBIT 3-13

FACTOR / CRITERION	ALTERNATIVE			SIGNIFICANT DIFFERENCE
	Highway 9 / Green Lane	New Freeway - Newmarket	New Freeway - Bradford	
1. TRANSPORTATION				
1.1 Traffic Operating Speed	●	●	●	
1.2 Traffic Volume	●	●	•	✓
1.3 Traffic Operations	●	●	●	
1.4 Safety	•	•	•	
1.5 Efficiency	●	●	●	
1.6 Network Aspects	•	•	●	✓
1.7 Financial	•	•	•	
1.8 Construction	•	•	•	✓
1.9 Staging	•	•	•	✓
2. NATURAL ENVIRONMENT				
2.1 Fisheries and Aquatic Habitat	●	●	•	✓
2.2 Wildlife	•	•	•	
2.3 Vegetation	•	•	•	
2.4 Wetlands	●	●	•	✓
2.5 Groundwater	•	•	●	✓
2.6 Surface Water	•	•	•	✓
2.7 Greenways and Open Space Linkages	•	•	•	
2.8 Soil	•	•	•	
3. SOCIAL ENVIRONMENT				
3.1 Aesthetics				
3.2 Highway and Construction Noise	•	•	•	
3.3 Community / Recreation	●	●	•	
4. ECONOMIC ENVIRONMENT				
4.1 Agriculture	•	•	•	
4.2 Commercial / Industrial	●	•	•	✓
4.3 Special Land Use Strategies	•	•	●	✓
4.4 Property Waste and Contamination	●	●	●	
4.5 Aggregates	●	•	●	✓
5. CULTURAL ENVIRONMENT				
5.1 Archaeology				✓
5.2 Historical	•	•	•	
6. APPLIED ENVIRONMENTAL CONDITIONS				
6.1 Stormwater Management	●	●	•	
6.2 Erosion and Sedimentation Control	•	•	•	
6.3 Sustainable Development	•	•	•	

● Good / Most Preferred • Fair · Poor / Least Preferred } See Exhibit 14 for rating guidelines

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

COMPARISON OF NEWMARKET AND BRADFORD CORRIDOR ALTERNATIVES

EXHIBIT 3-14

The Bradford Route offers substantial relief to Queensville Sideroad and Highway 88, as well as to Highway 9 - Green Lane, while the Newmarket freeway relieves Highway 9 - Green Lane and Mount Albert Road. Demand for Green Lane is virtually eliminated by the parallel freeway. The Newmarket route actually increases demand slightly through downtown Bradford, as it attracts trips down Highway 11 to the Green Lane corridor. The model run for Alternative 6 indicates a substantial reduction in long distance travel through central Bradford.

Therefore, overall, the computer simulations indicate that a freeway in the Newmarket Corridor (either along Highway 9 - Green Lane or on a nearby new alignment) would attract more local traffic in addition to the basic long distance demand, while the Bradford-area freeway would produce a more even distribution of demand across the various east-west routes available. Either option would protect Davis Drive and downtown Newmarket from congestion due to long distance through traffic, but only the Bradford Corridor offers any relief to downtown Bradford.

Network Aspects (Criterion 1.6)

A new highway in the Bradford corridor would be of significantly greater benefit to the area's transportation network than would a new "twin" of Highway 9 - Green Lane near Newmarket. This is because of two key issues:

- Every study of an east - west road south of Lake Simcoe has, over the course of three decades, sought to reduce out-of-way travel in the analysis area by improving links between the east and west sides of Lake Simcoe by skirting as closely as possible Cooks Bay. The current Highway 400 - 404 study is no different, and there is no question that a new route near Bradford would achieve that goal while a new route near Newmarket, being south of the existing link via Highway 88 and 11, would not.

- The existing road network south of Lake Simcoe is broken and incomplete, and while a new Bradford-area route would fill a gap in the grid a new freeway near or on Highway 9 - Green Lane would simply add capacity to an existing leg of the network without changing the road pattern significantly. The combination of existing east - west roads in the Newmarket areas, each being upgraded in the near term (Highway 9, Green Lane, Davis Drive, Mulock Drive) forms a grid network which has no equivalent in the Bradford - Queensville corridor. As a consequence, a new highway in the Bradford corridor would be the more effective of the two at improving trip routing flexibility, reducing vehicle kilometres of travel, improving mobility for emergency services, balancing peak traffic flows (e.g. distributing north - south recreational (cottage) traffic between Highways 400 and 404), and expanding community access.

Utilization of the overall road network would be more efficient with the Bradford corridor freeway, because the Newmarket equivalent would focus travel on a single roadway to a greater extent, resulting in some facilities such as the soon-to-be-widened four lane high-standard Highway 9 - Green Lane route being essentially superseded and more pressure being put on Highway 11 through Bradford as a feeder route. With the Bradford route, the lower volume on the facility means that there would be less pressure to construct to full freeway standards initially and that the whole network infrastructure would continue to be used at levels proportional to each leg's capacity.

Financial (Criterion 1.7)

While the analysis does not reveal dramatic differences in construction cost between the three freeway alternatives, it is of note that there would likely be a greater investment required to upgrade the municipal road network if the Newmarket Corridor were chosen than if the Bradford alternative were selected. This is another outcome of the network role of each corridor, in that Bradford West Gwillimbury would ultimately have to build or upgrade a downtown bypass route itself if that function were not provided by the new east-west freeway. Similarly, growth in demand on Queensville Sideroad (combining local and round-the-lake and recreational traffic) would also require its widening to four lanes in the long term with either of the Newmarket-area Alternatives. Conversely, the Bradford corridor, by complementing the near-term investment in improving the Highway 9 - Green Lane corridor rather than superseding it, eliminates the need to further improve the municipal road network north of Highway 9. The cost of such impacts have not been calculated, but it is evident that they would favour the Bradford route.

Construction (Criterion 1.8)

The key differences in terms of constructibility are at the freeway-to-freeway interchanges at either end of each alternative. In this respect, either Newmarket option faces a considerably greater challenge than does the Bradford option, because both the 400 and 404 interchanges for the former are located virtually atop existing (future) interchanges, necessitating complex detours, ramp realignment, higher road and structural costs, and traffic disruption. The possible Bradford corridor interchanges are generally located in open space and do not face such problems.

Fisheries and Aquatic Habitat (Criterion 2.1), Surface Water (2.6) and Stormwater Management (6.2)

These criteria all involve the number of crossings of permanent bodies of water, and the Bradford route is the lower rated of the alternatives due to its crossing of both branches of the Holland River rather than the single bridge needed for either route in the Green Lane corridor. Given the commitment of the MTO to bridge not only each watercourse but also the associated Class One Wetlands on either side and to a mitigation plan which would employ Best Management Practices to prevent bridge runoff from entering directly into fresh water, the net impact of any river crossing would be minimal under these criteria. Therefore, while the alternatives do differ, it is more a design issue thatwould require use of different mitigation measures than one which is so significant that it would make one alternative preferred over the other.

Wetlands (Criteria 2.4)

The Newmarket route avoids wetlands, while the Bradford route must cross the wetlands associated with the Holland River. In the latter case, it has already been noted that the road would be on structure over the entire wetland, thereby contributing to the cost difference under Item 1.7 but reducing the impact on the wetland environment under the Wetlands criterion It should be noted that little of the affected environment consists of undisturbed wetlands (they are avoided by the Bradford route), rather, most have been farmed, developed, diked or cleared at some point.

These points notwithstanding, either Newmarket-area corridor is overall less of a concern than the Bradford Corridor under this criterion.

Groundwater (Criterion 2.5)

The dominant groundwater feature in the study area is the Oak Ridges Moraine, which serves as a recharge area for the headwaters of almost all of the watercourses in York Region. The Highway 9 - Green Lane Alternative passes directly through the Moraine for more than seven kilometres and as such poses a significant concern in this respect. The quintupling of the overall road width from today's two lane highway will lead to unavoidable impacts to recharge areas along the route. The route of Alternative 4 has been carefully defined so as to avoid the Moraine to the greatest extent possible, but it would still pass through or at the edge of the feature for 3 km. The Bradford corridor is located well north of the Moraine.

Either new corridor would have similar localized impacts in terms of number of individual wells potentially affected.The piled foundations of the Bradford corridor structure across the Holland River could be in close proximity to one of the Town of Bradford West Gwillimbury's wells, but the aquifer is so deep that it is unlikely to be affected by any construction activity.

Highway and Construction Noise (Criterion 3.2) and Community / Recreation (Criterion 3.3)

This criterion essentially reflects the proximity of the new freeway to established or planned developed areas. The Highway 9 - Green Lane option, by making use of an established road right of way, is located closer to many more existing and future homes than either new route alternative, and is the least desirable option under this criterion. There is little difference between the new route freeways in terms of direct physical impact on residential communities, since both routes are designed specifically to avoid such areas. However, this is a case where the direct use of a key measure - "length of facility within 500 m of residential areas" - masks the actual differences between alternatives.

A more detailed breakdown of residential development surrounding the two new corridors shows the following:

Distance from New Freeway Centreline	No. of Existing Homes Within Specified Distance		No. of Planned New Homes[1] Within Specified Distance		Total	
	Nmkt.	Bradford	Nmkt.	Bradford	Nmkt.	Bradford
100 m	10	15	0	0	10	15
250 m	40	30	30	10	70	40
500 m	80	120	330	0	410	120
750 m	400	520	900	200	1300	720
1000 m	1360	900	1840	580	3200	1480

(1) calculated assuming average 15 units per hectare for serviced low density residential land use (Newmarket and Bradford) and 5 units per hectare in unserviced areas (Sharon)

The table reveals that, while both alternatives would be similar in terms of the number of existing homes most impacted, by the time construction actually begins in one or two decades there would be significantly more homes surrounding the Newmarket freeway corridor. One way of quantifying the overall comparison is to weight the numbers in proportion to their proximity to the freeway, i.e. 0 - 100 m = 5; 100 - 250 = 4 and so on down to 750 - 1000 m = 1. Existing homes would be weighted twice as heavily as new homes to reflect the more significant disruption to existing residents. Summing for each alternative in this way produces a factor of 3,400 for Newmarket and 1,950 for Bradford. Even considering only those homes within 500 m of the new route a similar ratio holds. The higher number reflects more residents likely to be concerned about proximity-related effects such as noise impact; on that basis the NewmarketAlternative would clearly have negative impacts on fewer residents than would Bradford.

Aside from proximity, the actual noise level is dependent largely on the traffic volume on the major road. In this respect, the fact that either of the Newmarket-area Alternatives would concentrate traffic on a single freeway while the Bradford Alternative would see demand spread more evenly among area roads would result in more noise affecting more people for the two Newmarket-area alternatives.

The impact of either route on recreational facilities is limited to a golf course on each -Cardinal in the Newmarket corridor and Silver Lakes north of River Drive Park. Cardinal could not be avoided with either Newmarket route but its extensive property would allow it to carry on as at least an 18 hole course. Silver Lakes could either be avoided (with correspondingly closer proximity to River Drive Park) or bisected by the BradfordAlternative. The latter would skirt Albert's Marina to the south, although a Marina buy-out option is also available. The Bradford Corridor avoids all Conservation Areas while the new freeway north of Green Lane would cross the Rogers Reservoir Conservation Area. No other public recreation facilities pose a significant concern.

Special Land Use Strategies (Criterion 4.3)

The York Region Official Plan shows a new provincial highway in the Bradford Corridor and not in the Newmarket Corridor. Consequently, the land use plans currently being developed for Holland Landing and Sharon in East Gwillimbury along with northwest Newmarket all reflect fact that no consideration has been given in any planning and development work to date at the municipal level for the possibility of upgrading the existing Highway 9 - Green Lane to a freeway design.

An update of the Bradford West Gwillimbury OP is underway (1997) in which the relationship of the Town to a future east-west highway is a key issue.

Apart from the (provincial freeway) network aspects of a 400-404 link, perhaps the key municipal issue is the relief offered to congested downtown streets by an alternative route for long distance (highway) traffic to pass through the analysis area. In Newmarket, Davis Drive is a major bottleneck, and the Green Lane upgrading (the first stage of either Alternative 2 or 4) is intended largely to resolve that problem. In Bradford, Highways 88 and 11, as they pass through the Town, force the mixing of highway and local traffic to similarly produce congestion and negative impacts on the downtown (to the extent that a key recommendation of the 1995 CAUSE report on Bradford is that "heavy commercial and through traffic should be routed around the community"). Bradford's

long-desired downtown revitalization cannot occur amidst the prospect of perpetual congestion of Highways 11 and 88; a bypass of Bradford is necessary in that respect, for improvements along Green Lane alone only serve to draw more, not less, traffic through downtown Bradford.

Under the land use strategy criterion, therefore, a combination of upgraded Highway 9 - Green Lane and a Bradford Corridor highway is clearly more necessary and more beneficial than an equivalent Highway 9 - Green Lane plus new Newmarket-area route.

(iv) Summary of Newmarket/Bradford Corridor Evaluation

Exhibit 3-15 highlights the tradeoffs which must be made when making a direct comparison between the Bradford, Newmarket and 9/Green Lane corridors. It should also be kept in mind that the travel demand modelling showed that, in the long term, demand will exceed the upgraded Highway 9 - Green Lane capacity by an amount that could only be satisfactorily accommodated by a new four lane controlled access highway. In other words, both a new arterial (i.e. Highway 9 - Green Lane) and a new freeway (in one of the identified corridors) need to be protected and planned for as links between Highways 400 and 404 in the northern part of York Region.

Given the substantial transportation network advantages of the Bradford corridor (which, after all, incorporates the already-planned four laning of Highway 9 - Green) there would need to be either a compelling advantage under some other factor to one of the Newmarket-area corridors or a "fatal flaw" in the Bradford route for the recommendation to be otherwise. The analysis reveals neither.

The Provincial and Municipal levels of government are already investing heavily in upgrading the Highway 9 - Green Lane route, yet the idea of taking that work to its ultimate end (i.e. as a controlled access freeway flanked by service roads) would entail total reconstruction of the corridor and significant social and environmental impact caused by the doubling in width of the required right of way through the rugged terrain of the Oak Ridges Moraine. This is why, as far back in the study as the draft Environmental Assessment Proposal in 1993, the position was taken that consideration would not be given to developing a new freeway on an existing major road alignment. Building the equivalent freeway on an adjacent route instead (i.e.the Newmarket Corridor) would be less complicated and some of the negative impacts on the surroundings could be avoided, but it still involves superseding a major investment without producing a significant change in the major road network of the area.

Only the Bradford Corridor offers the desired improvement in the road network (i.e. filling a significant network gap and expanding east-west capacity, rather than simply adding capacity in a corridor that will be served by the upgraded Highway 9 / Green Lane facility) while relieving municipal roads of long distance through traffic.

The investigation of alternative corridors does show that there are some pros and cons of each new route and that each is physically and environmentally feasible. The evaluation also shows that the Bradford-area roadway would be easier to build, be of substantially greater benefit to Bradford (given that each alternative has a similar effect on Newmarket), and, with sensitive engineering design, would have minimal negative effects on the surrounding natural and social environment.

Key Criterion	9 / Green Lane	Newmarket Corridor	Bradford Corridor
(1.2) Traffic Volume	Different impacts - no preference	Different impacts - no preference	Different impacts - no preference
(1.6) Network Aspects	-	-	Preferred: expands network as well as capacity
(1.7) Financial	-		Preferred: best complements investments in municipal roads
(1.8) Construction	-	-	Preferred: interchanges more easily constructed
(2.1) Fisheries and Aquatic Habitat; (2.6) Surface Water; (6.1) Stormwater Management	Slightly preferred; fewer river crossings	Slightly Preferred: fewer river crossings	-
(2.4) Wetlands	Preferred; no wetlands	Preferred; no wetlands	-
(2.5) Groundwater	-	-	Preferred: avoids Oak Ridges Moraine
(3.2) Highway and Construction Noise; (3.3) Community / Recreation	-	-	Preferred: fewer residences nearby
(4.3) Special Land Use Strategies	-	-	Preferred: supports municipal plans
(4.5) Aggregates	-	-	Preferred: no impact

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

SUMMARY OF CORRIDORS BY COMPARISON OF KEY CRITERIA

EXHIBIT 3-15

Although either Newmarket-area alternative largely avoids the wetlands associated with the Holland River, Highway 9 cuts directly through the environmentally significant Oak Ridges Moraine while the Newmarket corridor would affect substantial woodlot areas. From an overall natural environmental point of view, therefore, there are quantitative differences but no compelling advantages for either Alternatives 2 or 4 over the Bradford Corridor. With respect to the Bradford route, the need to be particularly sensitive to the potential impact on wetlands has dominated all of the previous studies of such a concept, and the MTO is working closely with the responsible authorities to ensure that water quality and aquatic resources are protected. Given that the MTO and Ministry of Natural Resources have already reached an understanding as to an acceptable physical location and associated design commitments for a new east - west crossing of the Holland River on the Bradford Corridor, the disadvantage facing the Bradford route is not a "fatal flaw". As noted above, this single disadvantage is substantially outweighed by the network and planning-level advantages of the Bradford package.

(v) Conclusion

On the basis of the above, the best overall "package" of solutions appears to be that of Highway 9 - Green Lane four laning plus protection for a new freeway in the Bradford corridor rather than on an alignment closer to Newmarket. It may also be concluded that a new freeway in the Newmarket Corridor (either on or near the Highway 9 - Green Lane route is less desirable overall than an equivalent new road in the Bradford Corridor and should not be pursued further as part of the Highway 400 - 404 Link Study.

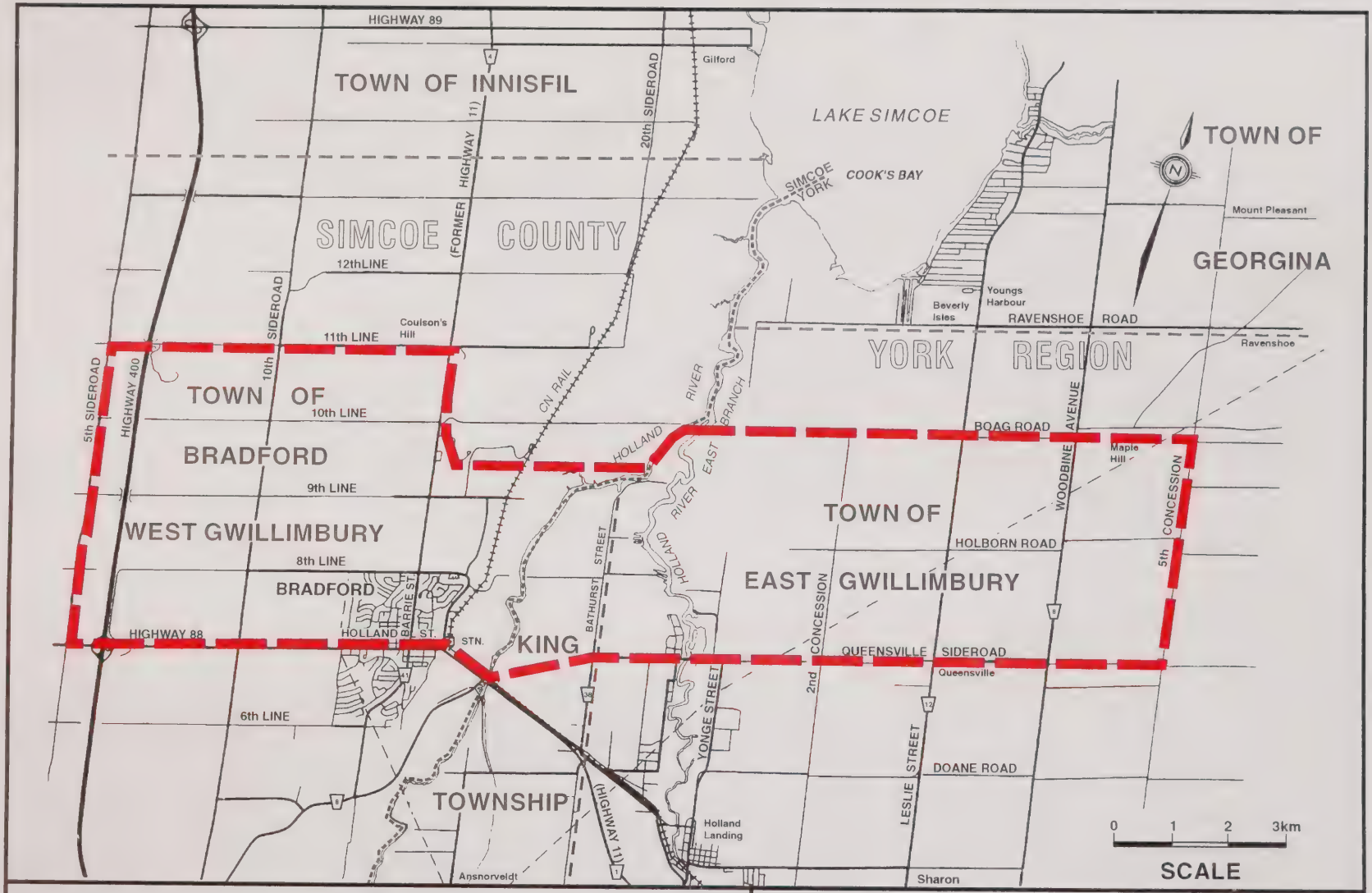
3.5.3 Bradford Corridor Study Area Boundaries

Based on the evaluation of corridor alternatives in the foregoing section, the analysis area for this study was narrowed down to the Bradford Corridor. The current study area for the development of alternative freeway routes is shown on Exhibit 3-16. It extends from Bradford West Gwillimbury 5 Sideroad (westerly limit) to East Gwillimbury Concession Road 5 (easterly limit). The portion of the study area east of Leslie Street was also under study as part of the concurrent and related Highway 404 Extension Environmental Assessment.

To the south, the study area is bounded by Holland Street (Highway 88) / Queensville Sideroad. At the west boundary the northerly limit follows Bradford West Gwillimbury 11th Line, shifting to the 10th Line midway between the 10 Sideroad and Yonge Street, then continues easterly across the Holland River to the easterly limit. The rationale for the selection of those limits is summarized in Exhibit 3-17.

The portion of the study area west of the Holland River is located in Simcoe County and the area to the east is within York Region. The local municipalities within the study area are the Town of Bradford West Gwillimbury in Simcoe, and the Town of East Gwillimbury and King Township in York.

The study area is primarily composed of agricultural areas, forest and wetlands. The community of Bradford is the major population centre; smaller communities located along the southern boundary of the study area include River Drive Park and Queensville.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK
(BRADFORD BYPASS) ROUTE LOCATION
AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY AREA FOR
THE 400-404 LINK

EXHIBIT
3-16

Boundary	Description*	Rationale
West	Bradford West Gwillimbury 5 Sideroad from Highway 88 to the 11th Line.	Given the proximity of 5 Sideroad to Highway 400, any new interchange with Highway 400 would affect 5 Sideroad. The study area therefore extends west of Highway 400 to include 5 Sideroad.
South	Highway 88 from 5 Sideroad to Highway 11; Highway 11 from Highway 88 to York Regional Road 83; Bathurst Street from Highway 11 to Queensville Sideroad (Y.R. 77); Queensville Sideroad from Bathurst Street to Woodbine Avenue.	Given the study objectives (particularly the reduction of out-of-way travel) there is obviously no potential solution located south of Highway 88 and the existing Highway 11 crossing of the Holland River (the most northerly river crossing). While all of Bradford is included in the study area in terms of potential impact, actual routes will only be considered north of (and including) Highway 88. To the east, the southerly limit established by Highway 88 is projected across to Woodbine Avenue, the limit falling on the Queensville Sideroad.
East	Woodbine Avenue from Queensville Sideroad to Boag Road	The easterly terminus of the 400-404 Link is intended to be the Highway 404 Extension. The eastern limit of the 400-404 Link study is therefore defined by the projection of the eastern limit of the Highway 404 Extension study area (Woodbine Avenue). The overlap of the two study areas allows a full range of locations and interchange types to be considered.
North	11th Line from 5 Sideroad to Highway 11; Highway 11 from 11th Line to the southern limit of the Scanlon Creek Conservation Area; easterly from there to the Holland River; northeasterly one-half concession and thence directly east to Woodbine Avenue in the vicinity of Boag Road.	The northern limit is defined by the most northerly potentially acceptable crossing of the Holland River, which is at the southern boundary of the Ministry of Natural Resources' Wildlife Management Area, located approximately at 10th Line. The entire area north of 10th Line was assessed thoroughly in previous EA studies, and it was determined that a crossing of the Management Area was not acceptable. A river crossing farther north would also entail unacceptable environmental impact. These were key issues which led to the withdrawal of the Highway 89 EA studies in 1986-87. To the east, the limit is extended to Woodbine Avenue along a line in the vicinity of Boag Road, while to the west of Highway 11, the limit jogs one concession northerly in order to allow for the consideration of a new interchange with Highway 400 in the previously endorsed location at 11th Line.

* Note: a one kilometre wide zone is identified beyond the defined study area limits, within which the impacts of an alternative route along the boundary road itself can be assessed; it is not intended to consider routes which pass through the "impact zone" itself.

4.0 ROUTE PLANNING

Chapter 3 outlined the groundwork which was laid for the route planning stage of the study discussed in this chapter, culminating in the identification of the preferred corridor and the defined study area limits

Chapter 4 describes the study area , generation of alternative routes and the analysis and evaluation of the alternative routes considered for the Highway 400 - Highway 404 Extension Link. The flow chart on Exhibit 4-1 may be used as a guide to this chapter.

Section 4.1 is a description of the study area characteristics which influenced the generation of route alternatives.

Section 4.2 is a description of the process used to develop route alternatives within the Bradford Corridor. Route alternatives broken down initially as route segments were identified as follows:

- West of Holland River (West Branch) with crossing of the Holland River at the north, middle, and south sections of the study area

- East of Holland River (West Branch) with crossing of the Holland River at the north, middle, and south sections of the study area

Section 4.2 also describes the analysis of the route segments and the evaluation procedure which was used to identify the preferred route segments. Route segments were then combined to form complete route alternatives between Highway 400 and proposed Highway 404 and subsequently evaluated resulting in the identification of the Technically Preferred Route.

A summary of comments from the public, external agencies during the evaluation process is included in Section 4.2.4.

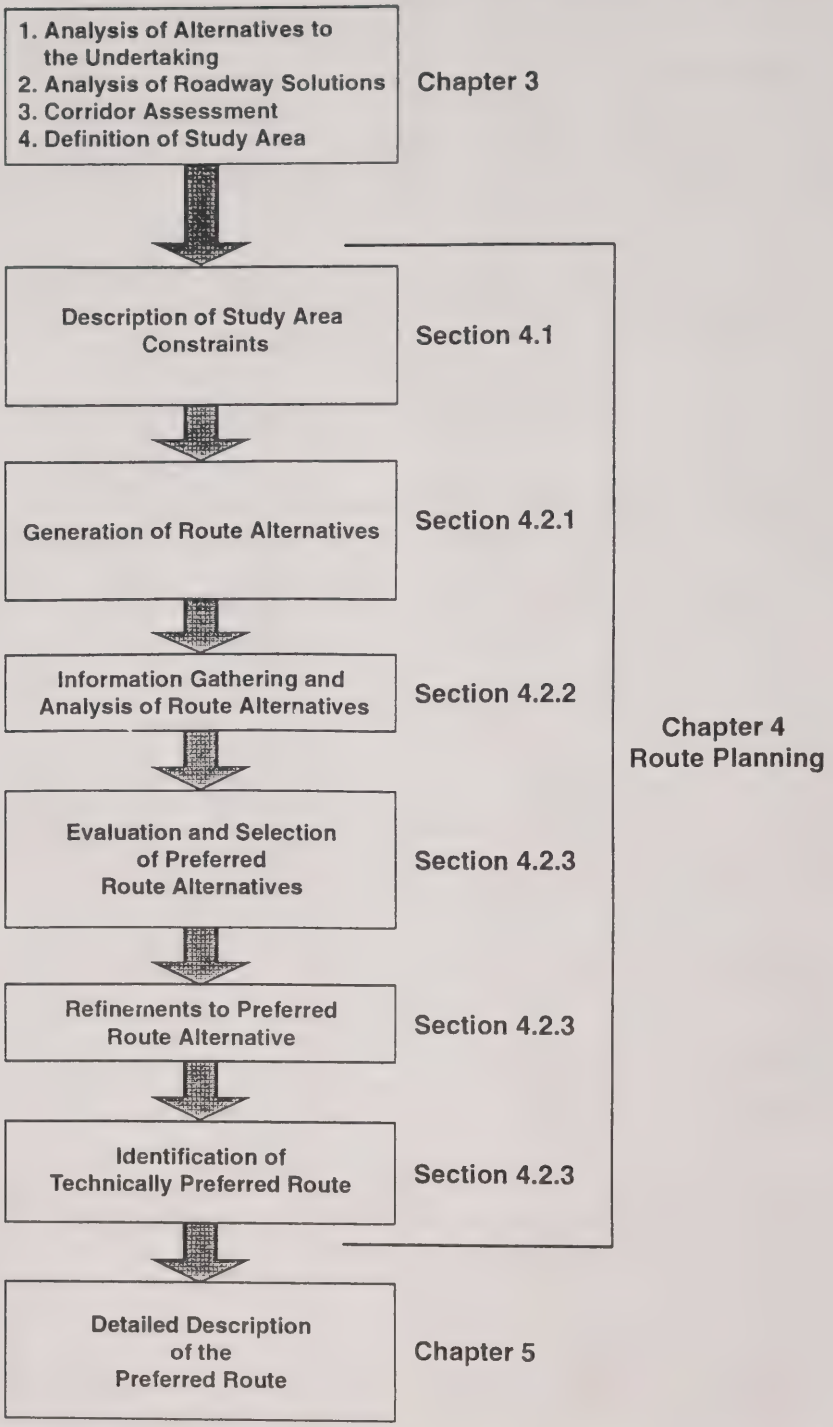
4.1 Description of Study Area

4.1.1 Information Gathering

The gathering of information was essential in identifying the baseline conditions of the study area. This material formed the groundwork for the generation and assessment of route alternatives and selection of the technically preferred route.

Information was gathered in the form of:

- published and unpublished documents, etc. obtained from government agencies and interest groups (e.g. Official Plans, property assessment information)
- consultation with government agencies and interest groups
- field surveys and field investigations (e.g. for geotechnical, historical, aggregate, resource assessments)



HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	ROUTE PLANNING PROCESS	EXHIBIT 4-1

- resource mapping (e.g. Agricultural Resource Inventory mapping)
- aerial photographic interpretation
- personal communications on an opportunistic basis (such as Public Consultation Sessions) and on a required basis (meetings held with individual property owners)
- literature searches (e.g. to determine community, historical and archaeological resources)
- contact with utility companies (e.g. Consumers Gas to determine locations of existing plants; future plans)

Information was gathered specifically for the broad environmental factors of Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment and compiled into individual Technical Reports to establish the baseline study area conditions (existing and future) to be used for the study. The reports also identified those areas and issues of significant concern in the study area of which were essential for the development of route alternatives described in the following sections. Some of the information formed the basis for the detailed assessments for the recommended concept plan, such as the natural environmental and agriculture biophysical assessment and the historical and archaeological assessment which are included as appendices in this EA Report.

Detailed descriptions of existing and future conditions including areas and issues of significant concern, documented in the Technical Reports, are available from the MTO[1]. Exhibit 4-2 highlights on a map the existing and future conditions in the study area.

With regard to the natural environment, an ecosystem approach was used to identify significant features in the study area.

"An ecosystem consists of air, land, water and living organisms, including humans, and the interactions among them. An ecosystem includes the community of living things and the complex of physical and chemical factors forming the environment."[2]

The ecosystem approach recognizes that an effect on one part of the system can impact all other parts. It integrates natural and physical factors in an effort to define the attributes of the system, understand how the ecosystem functions and how it is linked to neighbouring ecosystems.

The generally accepted primary boundary for an ecosystem approach to land use planning is the watershed or subwatershed. However, MOE also acknowledges that the use of other boundary definitions of ecosystems may be more appropriate depending on the application.[3] The nature of linear facilities, such as transportation corridors lends itself more to consideration of other biophysical boundaries which are defined physiographically.

Additional information was subsequently gathered in appropriate levels of detail for each stage of the evaluation (Section 4.2.3) including that in the corridor analysis described in Section 3.5.2.

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1 Contact: Steve Jacobs, Project Manager, MTO (416) 235-5522.

2 Ministry of the Environment, "Water Management on a Watershed Basis: Implementing an Ecosystem Approach" (Toronto, June 1993) p. 1.

3 Ministry of the Environment, "Toward an Ecosystem Approach to Land Use Planning" (Toronto, September 1992), p. 5.

Generally, as the location of the preferred route was being narrowed down through the net effects evaluation more detailed information was obtained in order to assist in understanding the differences in net potential effects between route alternatives.

4.1.2 Study Area Constraints

In Section 3.5.2 a broad description was given of the issues which would influence the identification of the preferred corridor. Following the corridor analysis and the resulting identification of the preferred corridor and defined study area, a detailed review of the corridor issues, specific to the study area, was required. The review was essential in identifying the aspects of the study area which most influenced the generation of alternatives.

4.1.2.1 Key Study Area Characteristics

The characteristics of the study area which influenced route generation are described below and referenced to relevant information documentation compiled for the study. Related study documentation as noted in the previous section are available from the MTO. The key characteristics of the study area are shown on Exhibit 4-3.

Scanlon Creek Conservation Area

The Scanlon Creek Conservation Area, at 284 hectares, is the largest public access property operated by the Lake Simcoe Region Conservation Authority (LSRCA). It is located north of Bradford between Highway 11 and the Holland River. It is of note that the "public use" portion of the Area is bounded by Highway 11, 10th Line, CN Rail tracks, and the mid-concession line between 9th and 10th Concessions. Other property owned by the LSRCA north of 10th Line and east of the rail line is not currently in active public use.

Activities which occur within the Conservation Area include picnicking, walking (trails), group camping, swimming, fishing, non-powered boating, cross country skiing, and snowshoeing. The Professor E.A. Smith Natural Resources Education Centre, located in the Area near Highway 11, is a facility open to school groups and public organizations through which programs in outdoor education and natural history are offered.

As a consequence of the sensitive nature of the Conservation Area and of its importance to the community, the 400-404 Link study area has been

Related Study Documentation

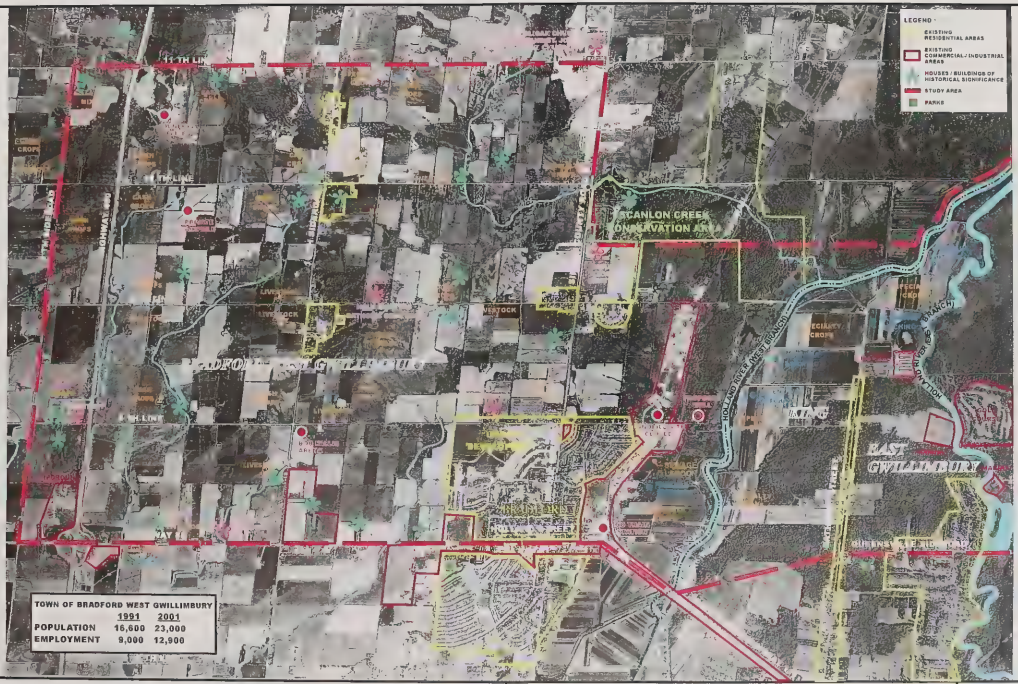
- Social Environment Inventory of Existing and Future Conditions - January 1995
- Economic Environment Inventory of Existing and Future Conditions - February 1995
- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Cultural Environment - Existing Conditions, Data Collected and Preliminary Assessment - April 1995

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK
(BRADFORD BYPASS) ROUTE LOCATION
AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY AREA - SIGNIFICANT NATURAL FEATURES (WEST)

EXHIBIT
4-2 (a)

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	**STUDY AREA - SIGNIFICANT NATURAL FEATURES (EAST)**	**EXHIBIT 4-2 (a)**

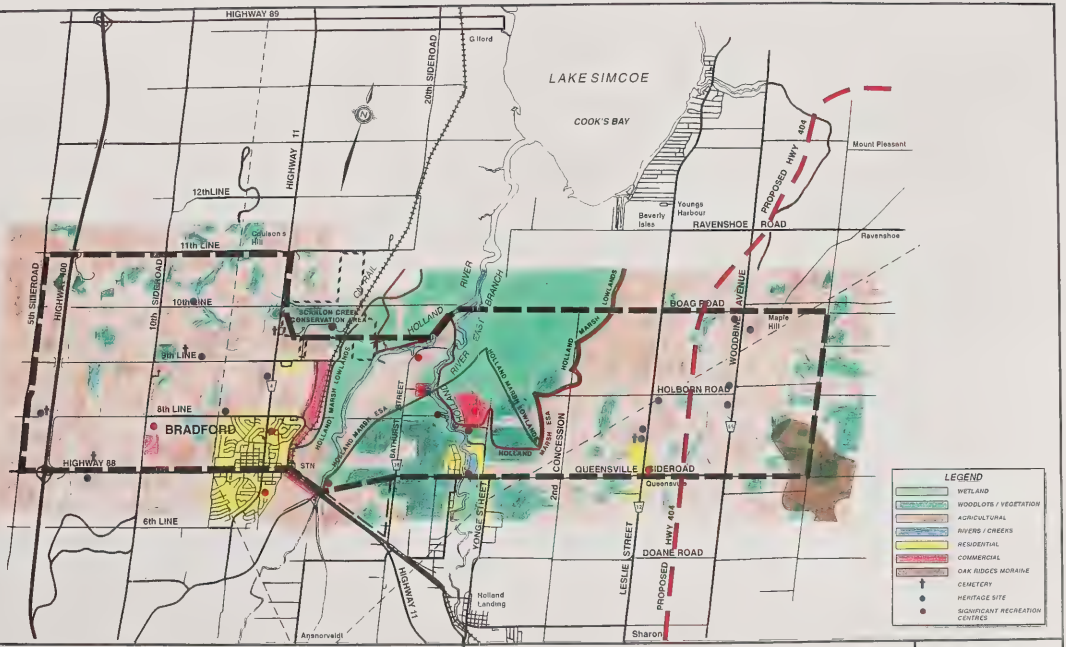


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK
(BRADFORD BYPASS) ROUTE LOCATION
AND ENVIRONMENTAL ASSESSMENT STUDY

STUDY AREA
BUILT ENVIRONMENT (WEST)

EXHIBIT
4-2 (b)

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	STUDY AREA BUILT ENVIRONMENT (EAST)	EXHIBIT 4-2 (b)



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

OVERVIEW OF STUDY AREA CHARACTERISTICS

EXHIBIT 4-3

0 1 2 3km

SCALE

defined so as to avoid the public use portion of the Conservation Area.

- Implementation Guidelines - Provincial Interest on the Oak Ridges Moraine Area of the Greater Toronto Area - June 1991
- Economic Environment Inventory of Existing and Future Conditions - February 1995
- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994

Oak Ridges Moraine

The Oak Ridges Moraine is a significant feature in the Southern Ontario ecosystem, and extends into the southeast portion of the 400-404 Link study area within East Gwillimbury. In July 1990, the Province of Ontario declared an interest in land use planning within the boundaries of the Moraine, with the intent being that any proposed development be scrutinized closely to ensure that environmental issues are considered, and that inappropriate development be prohibited. The generation of route alternatives within the Bradford corridor avoided the Moraine.

Wetlands

The provincial "Natural Heritage Policy Statement (1996)" highlights "loss of wetland functions" and "loss of contiguous wetland area" as key concerns in considering projects which may affect provincially significant wetlands (e.g. Holland Marsh). Discussions with MNR staff led to an understanding of what alternatives could reasonably be considered in light of the above policy statement. However, the policy statement provides for the location of necessary infrastructure in Provincially Significant Wetlands providing there is no feasible alternative, and that all possible impacts are mitigated.

- MNR Natural Heritage Policy Statement - 1996
- Social Environment Inventory of Existing and Future Conditions - January 1995
- Economic Environment Inventory of Existing and Future Conditions - February 1995
- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Natural Environment and Agriculture Biophysical Assessment for 400-404 Link (Appendix G)

Cemeteries

There are several small cemeteries in rural areas within the study area, in addition to one each in Bradford and Queensville. Route alternatives which disturb an existing cemetery were not considered.

- Cultural Environment - Existing Conditions, Data Collected and Preliminary Assessment - April 1995
- Historical and Archaeological Assessment (Appendix J)

Areas of Development

Location of a freeway through areas of concentrated existing residential and industrial/commercial development is not considered reasonable as the

- Social Environment Inventory of Existing and Future Conditions - January 1995

negative effects would be unacceptable to the community. Therefore route alternatives should, where possible, avoid contiguous areas of development.

- Cultural Environment - Existing Conditions, Data Collected and Preliminary Assessment - April 1995
- Municipal Official Plans
- Noise Analysis for 400-404 Link (Appendix H)

Existing Road Infrastructure

The layout of the existing road infrastructure significantly affects where a new freeway can be located. For example, any proposed interchange between the Link and a crossing road must be adequately spaced from nearby intersections to ensure satisfactory traffic operation. It is also important that the existing continuity of the local road network be maintained.

- Transportation and Utilities Inventory of Existing and Future Conditions - March 1995
- Travel Demand Analysis (Appendix A)
- Comparison of Alternative Routes Within Bradford and Newmarket Corridors (Appendix B)
- Municipal Official Plans

4.1.2.2 Additional Study Area Characteristics Which Influence Route Location

In addition to the key features outlined above the study area exhibits certain characteristic features which influence the location of alternative routes. Some of the physical characteristics, such as watercrossings, are governed by policies which further influence route generation by qualifying the importance of some of these physical features. The following briefly describes the significant study area characteristics which influenced route generation.

Residential Communities

The proximity of a highway to residential areas can adversely affect the lifestyle of the people who live in the area. Significant concerns include increases in noise levels that could be expected with a new freeway adjacent to a residential community, along with potential changes in traffic patterns on local roads. Route generation reflected the fact that, in general, the risk of negative impacts on residential communities diminishes in proportion to the distance from the new road. The potential for application of mitigation measures to reduce negative impacts is considered, such that route generation reflects the net impact on nearby residential areas (e.g. Bradford, River Drive Park, Queensville).

- Social Environment Inventory of Existing and Future Conditions - January 1995
- Cultural Environment - Existing Conditions, Data Collected and Preliminary Assessment - April 1995
- Noise Analysis for 400-404 Link (Appendix G)
- Municipal Official Plans

Agricultural Communities

A significant portion of the study area remains in active agricultural production although under varying degrees of urbanization pressure. By minimizing severances of agricultural enterprises, for example by locating alignment alternatives along mid-concession lot lines, the risk of negative impacts to agriculture are reduced.

- Social Environment Inventory of Existing and Future Conditions - January 1995
- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Cultural Environment - Existing Conditions, Data Collected and Preliminary Assessment - April 1995
- Natural Environment and Agriculture Biophysical Assessment for 400-404 Link (Appendix G)

Business Communities

The issue of access to highway facilities and relative location of the highway to businesses is important to the business community. It is undesirable to locate an alignment such that access to the commercial area is reduced, conversely, improved access could be helpful (e.g. as cited in the Ontario Association of Architects' 1995 CAUSE (Community Assist for an Urban Study Effort) study of downtown Bradford) by removing through/truck traffic from local business areas. The proximity of a highway to a commercial/industrial area (e.g. Artesian Industrial Parkway) can, by improving access to outside markets, contribute to the attractiveness and economic viability of an area.

To address these issues the MTO carried out an economic impact study for all Bradford area businesses.

- Economic Environment Inventory of Existing and Future Conditions - February 1995
- Natural Environment and Agriculture Existing Condition and Data Sources - May 1994
- Economic Impact Analysis for the 400-404 Link (Appendix I)
- Ontario Association of Architects CAUSE Report - May 15, 1995

Surface Water Features (Holland River)

In order to minimize the potential for negative effects on water crossings it is important to limit the number of crossings and attempt to orient them at 90° to the direction of flow. Other important considerations include how the river/creek relates to area wetlands, fisheries, wildlife habitat and groundwater quality/quantity issues.

- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Natural Environment and Agriculture Biophysical Assessment for 400-404 Link - August 1997
- Hydraulic Assessment of Holland River Crossing for the 400-404 Link (Appendix F)

Vegetation and Wildlife Habitat

Fens associated with the Holland Marsh are rare in Southern Ontario and should be avoided if possible when selecting routes. Woodlands in the study area perform a number of ecological functions including providing extensive interior habitat conditions for

- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Natural Environment and Agriculture Biophysical Assessment for 400-404 Link (Appendix G)

wildlife, including their movement along corridors. Therefore the maintenance of wildlife habitat integrity and diversity and the maintenance of wildlife corridor functions were important considerations in locating route alternatives.

Topography

In general, it is desirable that an alignment follows the topography of the land in order to minimize both construction cost and environmental impact. The rolling topography in the vicinity of Bradford and the area north of Queensville was a consideration when planning for interchanges at grade-separated crossings and extending alignments near developed areas where the right-of-way required for the road could affect adjacent properties.

- Natural Environment and Agriculture Existing Conditions and Data Sources - May 1994
- Natural Environment and Agriculture Biophysical Assessment for 400-404 Link (Appendix G)

Heritage/Archaeological Sites

A new roadway should avoid, to the extent possible, direct or indirect impacts on known sites of cultural importance.

- Cultural Environment - Existing Condition, Data Collected and Preliminary Assessment - April 1995
- Historical and Archaeological Assessment for the 400-404 Link (Appendix J)

Highway 404

The 400 - 404 Link route alternatives must, by definition, consider a connection with all of the route alternatives identified for Highway 404 in the concurrent Highway 404 Extension Route Planning Study.

- Transportation and Utilities Inventory of Existing and Future Conditions - March 1995
- Travel Demand Analysis for the 400-404 Link (Appendix A)
- Municipal Official Plans

4.2 Route Planning

4.2.1 Description and Rationale for Route Generation Criteria

In Section 3.5.2 of this report, the Bradford Corridor is identified as the preferred location for protecting for a future freeway. Based on the identification of the Bradford Corridor the Project Team set out to develop a broad range of alignment alternatives.

Exhibit 4-4 describes and rationalizes the route generation criteria established to identify a preliminary set of route alternatives. The route generation criteria follows the basic transportation design principles of: roadway design; compatibility with constraints; and, application of provincial policy.

Generation Criteria	Rationale
Roadway Design	
• the freeway, if possible, should be consistent between Highway 400 and 404 Extension, i.e. with a 120 km/h design speed	• safety of highway operation relies to a great extent on predictable consistent design standards. The efficiency, level of service, and safety of a provincial highway will be limited to that of its lowest standard segment (for example, two freeway segments linked by a city street will function overall no better than a city street, and the investment in freeway infrastructure will be wasted). This principle is definitive in the case of a new route, but in considering an existing roadway it may not be possible to fully achieve
• the freeway should have controlled access and be fully grade separated at all crossings	• this design standard applies to all provincial freeways, for reasons of safety, level of service, and efficiency
Compatibility with Study Area Constraints	
Natural Environment	
• minimize impacts to the natural features of the study area, such as: Scanlon Creek Conservation Area, Oak Ridges Moraine and numerous wetlands associated with the Holland Marsh	• these are key concerns voiced by study area residents, interest groups and fall under regulatory control (see provincial policy section below)
• minimize impacts to vegetation and wildlife habitat area including those areas functioning as corridor linkages	• removal/disturbance of vegetation especially woodland areas are key concerns raised by the public, interest groups and the MNR; alignments that impact these areas could threaten both plant and animal species by removing/fragmenting habitat and severing corridor linkages
• minimize the number of watercourse crossings	• watercourse crossings can affect watershed flow patterns and directly affect the watercourse and how it relates to area wetlands, fisheries, wildlife habitat and groundwater
Social Environment	
• avoid contiguous areas of residential development	• new freeways near residential areas can impact lifestyles and affect property values of area residents; they can also result in the removal of houses; impacts of freeway noise to residents fall under regulatory control (see provincial policy section below)
• minimize property impacts by locating alignments along lot lines	• property impacts have been identified as a key concern by area residents including specifically, compensation, timing of acquisition; location of right-of-ways along lot lines can reduce the number of properties affected and/or reduce the amount of property required from each property owner

Generation Criteria	Rationale
Economic Environment	
• maintain the viability of existing commercial businesses directly affected by route alternatives	• a property severance could make a business unviable in that it would have to relocate which is undesirable; unviability could be unforeseen and occur over a long period of time reducing the business owner's ability to seek compensation; business owners have identified business viability as a key concern
• maintain or improve access/visibility	• location of alternatives which would remove or reduce access/visibility is undesirable; this has been identified as a key concern by area business owners
• minimize impacts to farming operations by locating alternative routes along lot lines	• locating alignments along lot lines can reduce the number of properties affected and/or the amount of property required from each farm owner; this is also crucial in maintaining large enough parcels of farmland to ensure the continued viability of the existing farm operation or at least to ensure the land's continued agricultural use
Cultural Environment	
• avoid cemeteries when locating route alternatives	• cemeteries have high social and cultural values
• minimize impacts to known heritage and archaeological features	• this is a key concern raised by area residents and interest groups; they are non-renewable cultural resources
• avoid the Scanlon Creek Conservation Area	• this was identified as a minimum condition by the public for location of acceptable route alternatives
Application of Provincial Policy	
• new freeways in the vicinity of existing residential developments are subject to MOEE/MTO guidelines concerning the impacts of noise therefore route alternatives should avoid those areas of potential significant impact	• effects of noise is typically a key concern for residents when planning for a freeway, as such the MOEE and MTO have established criteria which attempts to protect the public from significant impacts of noise generated from roadways
• new roadways in the Holland Marsh will be limited to areas of significant disturbance, and will respect the provincial wetlands policy statement	• discussions between MTO and MNR staff produced an understanding of what was and what was not acceptable to consider in the provincially significant Class One Wetlands area of the Holland Marsh The principle agreed on was one which balances and respects the mandates of both Ministries.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

DESCRIPTION AND RATIONALE FOR GENERATION CRITERIA

EXHIBIT 4-4

Information gathering was an initial step in the generation of alternatives. A preliminary survey of existing land use and environmental features of the study area, was carried out through field surveys, public consultation, review of secondary source materials and government agency/municipal staff consultation. This information together with the generation criteria described in the previous section enabled the Project Team to identify route alternatives. In addition to applying the generation criteria each alternative was developed such that they would, at a minimum, address the basic transportation needs identified in Section 3.1.1, however to the degree to which the transportation deficiencies and effects on the environment were addressed by each alternative was different.

The initial stage in the development of alternative concepts examined different locations and types of roadway improvements, and a set of roadway alternatives was identified and discussed with the public at the first round of public consultation in June 1993. However, the basis for considering different types of improvements was superseded following the completion of the travel demand analysis (see Section 3.1.2.2 and Appendix A) which indicated that only new route alternatives of the freeway type would be a reasonable approach in addressing the area's existing and future anticipated transportation problems. The freeway route alternatives are shown in Exhibit 4-5. Due to the large number of alternatives and possible combinations, the alternatives were separated into those west of the Holland River and those east of the Holland River. Within the east and west sections the alternatives were further divided into functionally similar route segments for the purposes of analysis and evaluation. Each route segment was given an alphabetic designation. Upon review of the route alternatives generated by the Project Team, one additional freeway route alternative was suggested by a member of the public and thus was included in the analysis and evaluation of freeway routes. This is discussed in Section 4.2.3.5.

4.2.2 Analysis of Route Alternatives

Following the generation of reasonable freeway route alternatives in the study area, an analysis of the route alternatives for each segment was carried out based on a defined set of 16 evaluation criteria within five broad environmental factors:

- Transportation
- Natural Environment
- Social Environment
- Economic Environment
- Cultural Environment

The analysis provided the Project Team with a complete and traceable description of each route alternative's impacts (both positive and negative) with respect to the environment under the five factors.

The above factors are the same as those used for the analysis and evaluation of corridor alternatives (Section 3.5). Each of the evaluation criteria were further defined by the use of indicators. Indicators were selected as a means to measure the impact of each alternative and were either quantitative or qualitative. The indicators were quantitative wherever possible and provided the necessary detail

to describe the alternatives. The qualitative indicators were subjective and were a combination of technical facts and professional judgement. For example, for quantitative indicators such as the route segment length, the actual number associated with each alternative was the method of measurement. The quantitative analysis is straight forward in how it measures potential impacts, however, the method for measuring potential impacts qualitatively is more complex. For qualitative indicators involving positive effects, typically a rating of good, fair or poor was used; for other indicators focusing on impacts a rating of minor, moderate or major was used. A description of how each qualitative indicator was measured including the method used to determine the significance of the impact is included in Appendix D.

One hundred and thirty (130) indicators were identified in all. The factors and associated evaluation criteria are shown in Exhibit 4-6. These factors were made available to the public for review and comment at each Public Consultation Session.

The framework to identify the significance of each route alternative's impact on the environment for each factor, criteria, and indicator was developed by the Project Team as part of the Environmental Assessment Proposal (refer to Section 2.1). Referred to as Environmentally Significant Issues/Areas their development was based primarily on information gathered and compiled for the study (Section 4.1.1 and Exhibit 4-2) and relied upon input from study area residents, interest groups, and government agencies. The identification of environmentally significant issues/areas was essential in determining the relative significance of each factor, criteria, and indicator to be used for the analysis and subsequently, the route generation criteria established to develop route alternatives (refer to Exhibit 4-3).

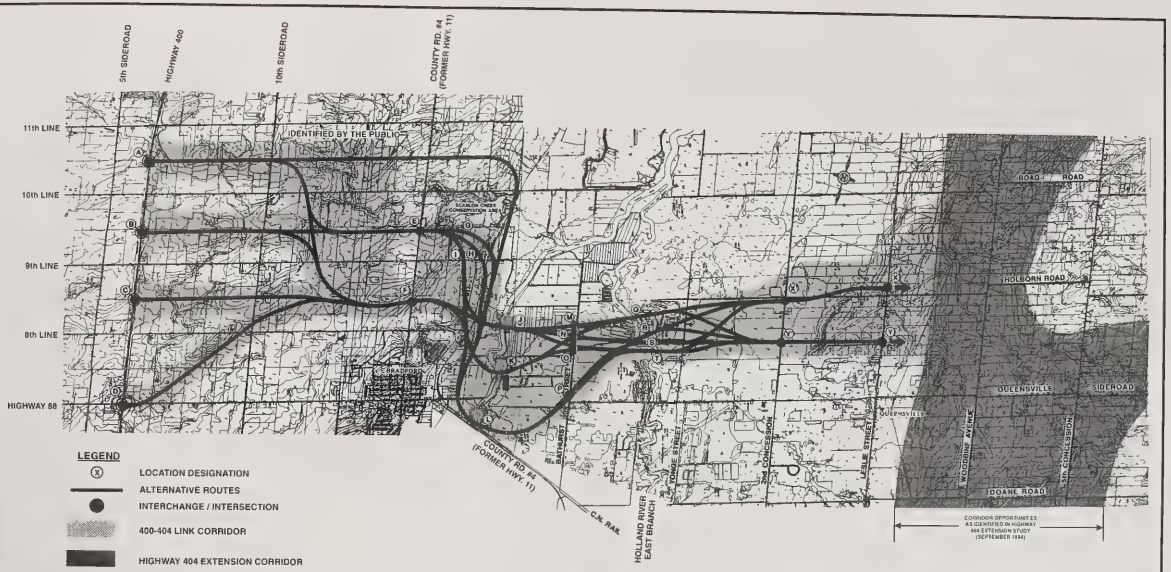
The route alternatives were made up of a combination of forty-three route segments which when combined formed complete routes from Highway 400 to the future Highway 404 extension. For the analysis, functionally similar segments were divided into ten sets in order to organize them into a more manageable group for the evaluation. The 10 sets were categorized. Alternatives **west** of the Holland River were grouped in sets that would cross the river in a **north, middle and south** location. Alternatives **east** of the Holland River were grouped in similar sets.

As the evaluation progressed, additional information was gathered for each indicator for analysis purposes. This was necessary in that as the location of the preferred route was being narrowed down through the net effects evaluation more detailed information assisted in understanding the differences between route alternatives.

4.2.3 Evaluation and Selection of Preferred Route

4.2.3.1 Overview

The evaluation to determine the technically preferred route was carried out by the Project Team based on analytic data and in consideration of input provided by the public, interest groups, and affected government and technical agencies. Two types of evaluation methods were utilized to identify the preferred route: 1) the Weighting-Scoring Method (Numerical); and, 2) Trade-Off Method (Professional Judgement). The two methods were necessary and complimentary to each other. The Weighting-Scoring Method, being numerical, provided a traceable process of evaluation



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

FREEWAY ROUTE ALTERNATIVES

EXHIBIT 4-5

SCALE

FACTOR	CRITERIA	INDICATOR
1 Transportation	1.1 Traffic Operations • Examines how well each alternative will allow traffic to move through the study area	a) roadway design speed
		b) actual peak hour operating speed
		c) potential slow moving vehicles
		d) change in speed loss from existing
		e) design hour volume (forecast)
		f) peaking Characteristics
		g) forecast growth trend
		h) change in traffic volume from existing
		i) level of service
		j) number of traffic signals
		k) passing opportunities
		l) travel time
		m) number of interchanges / intersections
		n) number of roadway entrances
		o) pedestrian movement along / across roadway
		p) fixed obstacles within right of way
		q) number of minimum design standard curves
		r) climatic conditions
		s) route length
		t) energy usage by a vehicle on alternative
		u) effect of alternative on net energy usage on
		v) transportation system
	1.2 Network Compatibility • Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs	a) effect on traffic volumes on parallel / crossing roads
		b) effect on traffic operations on parallel / crossing roads
		c) consistency of design / operation
		d) continuity of Road Classification
		e) continuity of Alignment
		f) continuity of Jurisdiction
		g) length of construction period
		h) ability to stage implementation of the undertaking
		i) ability to upgrade undertaking as warranted by future needs
	1.3 Cost • Examines the short- and long-term cost of each roadway alternative	a) construction cost
		b) operating cost
		c) maintenance cost
2 Natural Environment	2.1 Fisheries and Aquatic Habitat • Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat	a) water crossings or encroachments by stream order (lakes, rivers / streams, wetlands)
		b) permitted surface water intakes affected
		c) presence of species at risk (rare or endangered)
		d) areas of critical fish habitat (includes spawning areas, migratory runs)
		e) presence of warmwater / coldwater communities
		f) degree of interaction with ground water (presence of highly permeable soil)
	2.2 Wildlife • Examines the impact each alternative will have wildlife species and habitat	a) encroachment on or severance of forested vegetation or non-forested successional areas
		b) encroachment on or severance of greenways and open space linkages (wildlife travel corridors)
		c) encroachment on or severance of significant wildlife habitat (waterfowl areas, deer yards, heronries)
		d) presence of species at risk (rare or endangered)
	2.3 Wetlands • Examines the impact each alternative will have on wetland resources	a) loss of function (biological, hydrological, special features) of all wetlands within or adjacent to study area
		b) loss of wetland area of all wetlands within study area
		c) degree of interaction of all wetlands with ground water
		d) encroachment on (within 120 m) or severance of class 1-3 Provincially Significant wetlands wetland areas
2 Natural Environment (continued)	2.4 Vegetation • Examines the impact each alternative will have on vegetation units and individual specimens	a) encroachment on or severance of high quality forest stands (based on dominant species, age, size, shape)
		b) encroachment on or severance of Life Science ANSIs encroachment on or severance of ESAs
		c) encroachment on or severance of Oak Ridge Moraine Planning Area forests
		d) encroachment on or severance of Oak Ridge Moraine Planning Area forests
		e) presence of significant species or specimens at risk (rare or endangered)
		f) encroachment on or severance of unusual vegetation units
		g) erosion control on steep slopes
		h) presence of riparian habitat
	2.5 Ground Water • Examines the impact each alternative will have on commercial and domestic water supply	a) ground water recharge underlain by highly permeable soil and unconfined aquifer
		b) shallow ground water table potential release of contaminants into ground water
		c) municipal or permitted water supply well (s)
		d) areas of significant regrading at recharge / discharge areas
	2.6 Geology • Examines the impact each alternative will have on significant land areas	a) encroachment on or severance of Earth Science ANSIs
3 Social Environment	3.1 Community Effects • Examines the impact each alternative will have on communities, neighbourhoods, individuals and related land uses (residential, institutional, recreational	a) compatibility with municipal official plans and development proposals
		b) severance of residential neighbourhoods and rural communities
		c) displacement or extraordinary isolation of homes
		d) overall effect on access to residential areas and rural communities
		e) overall degree of disruption to residential communities
		f) overall effect on major community facilities / institutions / parks
		g) effect on municipal utility and residential sewage systems
		h) potential bicycle use
		i) overall effect on community cohesion
		j) overall effect on community character
		k) overall effect on emergency response routes
	3.2 Aesthetics • Examines the visual impacts of each alternative	a) total aesthetic quality of the existing landscape in the vicinity of each route alternative
		b) future aesthetic quality based on scenic views of the surrounding area from the route
		c) future aesthetic quality based on negative views of the route from areas of sensitive viewer groups
	3.3 Noise • Examines the noise impact each alternative will have on adjacent receivers	a) noise sensitive receivers which are predicted to experience increases in sound levels 5 dBA above existing ambient conditions, 10 years after project completion
		b) noise sensitive receivers which are predicted to experience increases in sound levels which result in an absolute noise level over 55 dBA 10 years after project completion
		c) noise sensitive receivers which are predicted to experience significant construction noise problems
4 Economic Environment	4.1 Agricultural • Examines the impact each alternative will have on farming operations and employment	a) loss of Class 1 and 2 agricultural land
		b) loss of Class 3 and 4 agricultural land
		c) loss of Class 5 and 6 agricultural land
		d) specialty crop operations affected
		e) loss of specialty crop soil
		f) dairy / livestock operations affected
		g) field crop operations affected
		h) effect on future flexibility of farm operations
		i) effect on farm woodlots
		j) effect on capital investments in agricultural operations
		k) significant farm operation severances
		l) significance of detrimental effects to ongoing viability of farm operations
		m) significance of detrimental effects to ongoing viability of farm communities
	4.2 Commercial / Industrial • Examines the impact each alternative will have on commercial / industrial businesses and employment	a) severance of commercial areas
		b) displacement of commercial businesses
		c) effect on overall access to commercial areas
		d) effect on highway exposure for commercial areas
		e) severance of major industrial areas
		f) displacements of major industries
		g) effect on overall access to major industrial areas
		h) effect on overall travel time and distance for local manufacturers and shippers
		effects on regional distribution of manufacturing
		j) overall effect on regional and local economy
		k) significance of overlap with any federal / provincial land use plans and policies
		l) waste / contamination of properties
		m) significance of property waste / contamination problems
		n) loss of high potential mineral / aggregate deposit areas
		o) existing mineral / aggregate operations directly affected
5 Cultural Environment	5.1 Archaeological • Examines the impact each alternative will have on archaeological features	a) significant archaeological sites directly affected
		b) areas which have a high potential for archaeological sites
		c) severance of related archaeological sites
	5.2 Historical • Examines the impact each alternative will have on heritage features	a) historical cultural landscapes
		b) sites of architectural and / or historical significance directly affected

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EVALUATION CRITERIA

EXHIBIT 4-6

using relative and absolute scores to rank alternatives while the Trade-Off Method, in association with the former, allowed the Project Team to discuss and arrive at a consensus regarding the preferred alternative.

The results of the Weighting-Scoring Method were then used to verify the results of the Trade-Off Method.

4.2.3.2 Weighting-Scoring Method

The weighting-scoring method produces a single numerical result to reflect the total impacts associated with a route alternative. While the weighting-scoring method is a valuable technique for focusing and aiding traceability of the evaluation of a large number of alternatives, it is inappropriate (in most cases) to rely entirely on such a numerical approach, independent of trade-off analysis and professional judgement, to reach absolute conclusions as to a recommended route. Both the weighting and scoring of each indicator can mask distinct or critical features, since each indicator is only one of many, and a "10" score in a critical area can often not be reflected in the total score if many other indicators are only average. Also, the correlation of a score to a particular level of import remains a matter of judgement in many cases. Finally, by breaking down each alternative into more than 100 discrete (from a scoring perspective) measures, the method may have the effect of obscuring the "big picture" whereby professional judgement, public opinion, municipal operations, and strategic transportation needs shape the decision-making context.

With the weighting-scoring method, evaluation criteria are given a weight, based on level of importance, and a score based on the magnitude of the impact. Following the Weighting-Scoring Method and also following the Trade-Off Method discussed in the next section, the weight and score of each criterion are multiplied together, and added together with the weight-score product of the other criteria to obtain a total weighted score for the route alternative.

Establishing a Weight (Level of Importance)

The individual team members assigned weights to each of the five factors by distributing 100 points among these factors. The more important factors received a greater number of points and those of less importance received a fewer number of points. It should be noted that the assignment of weights was based on professional judgement and formed a basis for discussion by the Project Team to arrive at a consensus on the weights for each factor.

A similar weighting was carried out for the five sets of criteria within the factors. These weights were then proportioned to the weight assigned to each factor, resulting in a percentage weighting for each criterion.

In addition to the Project Team weighting, a public weighting of the criteria was conducted in a similar manner and included in the evaluation of route alternatives. At the second round of public consultation in mid 1994, a questionnaire was distributed that collected data required to tabulate an overall public weighting for the analysis. It should be noted, however, that less than fifty completed questionnaires were returned, so the results can not be considered statistically "representative" of the views of the 15-20,000 residents of the study area. This questionnaire is shown in Exhibit 4-7. It should be noted that the Project Team weightings were arrived at in advance of, and with no knowledge of, the public weightings.

Establishing a Score (Degree of Impact)

For each of the route segments within the 10 alternative sets, the Project Team assigned a score for each criteria in two different ways:

BRADFORD BYPASS ENVIRONMENTAL ASSESSMENT STUDY
WEIGHTING OF EVALUATION FACTORS BY THE PUBLIC

The various factors to be used in comparing alternative Bradford Bypass routes were documented in the draft Environmental Assessment Proposal and reviewed at the first set of Public Information Centres. Your input is now being sought as to the relative importance of each of the factors. This will be used to help the Ministry of Transportation decide on a preferred route for the Bradford Bypass.

Please review the information package or the Public Information Centre Displays for the Bradford Bypass, before filling out this survey. Please complete the "OVERALL FACTORS" Table first. Then, if you are interested, you may fill our the more detailed survey on the other side of this form Assign a greater percentage to those factors that are more important, and lesser to those which you feel are less important. Any additional comments are welcome (see other side of page).

OVERALL FACTORS

Out of 100 percent, what percentage importance should be given to each factor when comparing alternative routes for a Bradford Bypass?

FACTOR	INCLUDES	PERCENT
1. TRANSPORTATION	How well each alternative serves motorists' needs How alternative fits into the existing and future highway network Cost of building and operating alternative	%
2 NATURAL ENVIRONMENT	Fish and aquatic life Birds, animals, vegetation and forests Holland Marsh, other wetlands In-ground water and wells	%
3 COMMUNITY/SOCIAL ENVIRONMENT	Views of and from the roadway Effect of roadway Accessibility/disruption to neighbourhoods and recreation	%
4. ECONOMIC/LAND USE	Effect of roadway on farm properties and operations Effect of roadway on business	%
5. HERITAGE	Known or potential archaeological sites Buildings/sites of architectural or historical significance	%
		TOTAL=100%

I wish to have this survey apply to (check one)

- ☐ Bradford Bypass Study
- ☐ Highway 404 Extension Study
- ☐ Both Studies

Please hand in at Information Centre, or mail or fax to:

Mr. S. Schijns, P. Eng.
McCormick Rankin Consulting Engineers
2655 North Sheridan Way
Mississauga, Ontario L5K 2P8

Telephone: (905) 823-8500
Fax: (905) 823-8503

BRADFORD BYPASS ENVIRONMENTAL ASSESSMENT STUDY
WEIGHTING OF EVALUATION CRITERIA BY THE PUBLIC

SIDE 2; PLEASE READ AND FILL OUT THE OTHER SIDE OF THIS FORM FIRST

Your input is requested as to the relative importance you feel should be applied to the different criteria to be used in comparing alternative routes for a Bradford Bypass. Assign a greater percentage to those criteria that are more important, a lesser to those which you feel are less important

1. TRANSPORTATION

CRITERIA	INCLUDES	PERCENT
1.1 Traffic Operations	How well each alternative serves motorists' needs	%
1.2 Network Compatibility	How alternative fits into the existing and future highway network	%
1.3 Cost	Cost of building and operating alternative	%
		TOTAL=100%

2. NATURAL ENVIRONMENT

CRITERIA	INCLUDES	PERCENT
2.1 Fisheries & Aquatic Habitat	Fish and aquatic life	%
2.2 Wildlife and Habitat	Birds, animals, vegetation and forests	%
2.3 Wetlands	Holland Marsh, other wetlands	%
2.4 Groundwater	In-ground water and wells	%
		TOTAL=100%

3. COMMUNITY/SOCIAL ENVIRONMENT

CRITERIA	INCLUDES	PERCENT
3.1 Aesthetics	Views of and from the roadway	%
3.2 Noise	Effect of roadway on community noise levels	%
3.3 Community Effects	Accessibility/disruption to neighbourhoods and recreation	%
		TOTAL=100%

4. ECONOMIC/LAND USE

CRITERIA	INCLUDES	PERCENT
4.1 Agricultural	Effect of roadway on farm properties and operations	%
4.2 Commercial/Industrial	Effect of roadway on business	%
		TOTAL=100%

5. HERITAGE

CRITERIA	INCLUDES	PERCENT
5.1 Archaeology	Known or potential archaeological sites	%
5.2 Historical	Buildings/sites of architectural or historical significance	%
		TOTAL=100%

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

QUESTIONNAIRE USED FOR PUBLIC WEIGHTING OF EVALUATION CRITERIA

EXHIBIT 4-7

- Relative Score: The Project Team assigned 10 points to the best route segment within the group for a particular criteria and rated the other route segments from 1 to 10 in comparison with the best route segment.

- Absolute Score: The Project Team assigned a score of 0 to 8 to each route segment for each criteria (a score of 0 to 3 described negative impacts (0 being worse than 3); 4 no impacts (or not applicable); and 5 to 8 positive impacts).

4.2.3.3 Trade-Off Method

Following the weighting of factors and scoring of alternatives, the Project Team arrived at a consensus regarding the preferred route segment and the rationale for the preference using the Trade-Off method of evaluation. With this method, the differences in identified net effects are compared for their relative advantages and disadvantages and "traded-off" to determine the preferred route alternative. The trade-offs that were used in determining the preferred routes are based on the level of importance each factor was assigned by the Project Team and the significance of identified effects relative to each alternative considered in the analysis.

Verifying the Preferred Alternative

To verify the preferred alternative, as noted in the previous section, a total score for each route segment alternative was determined by multiplying the factor weights by the scores to create a weighted score for both the Project Team weights and Public Team weights.

The Project Team then compared the relative and absolute weighted scores and trade-off results and reached a consensus as to the preferred alternative(s). This evaluation procedure is shown graphically in Exhibit 4-8.

4.2.3.4 Evaluation Process

The evaluation process was divided into four stages:

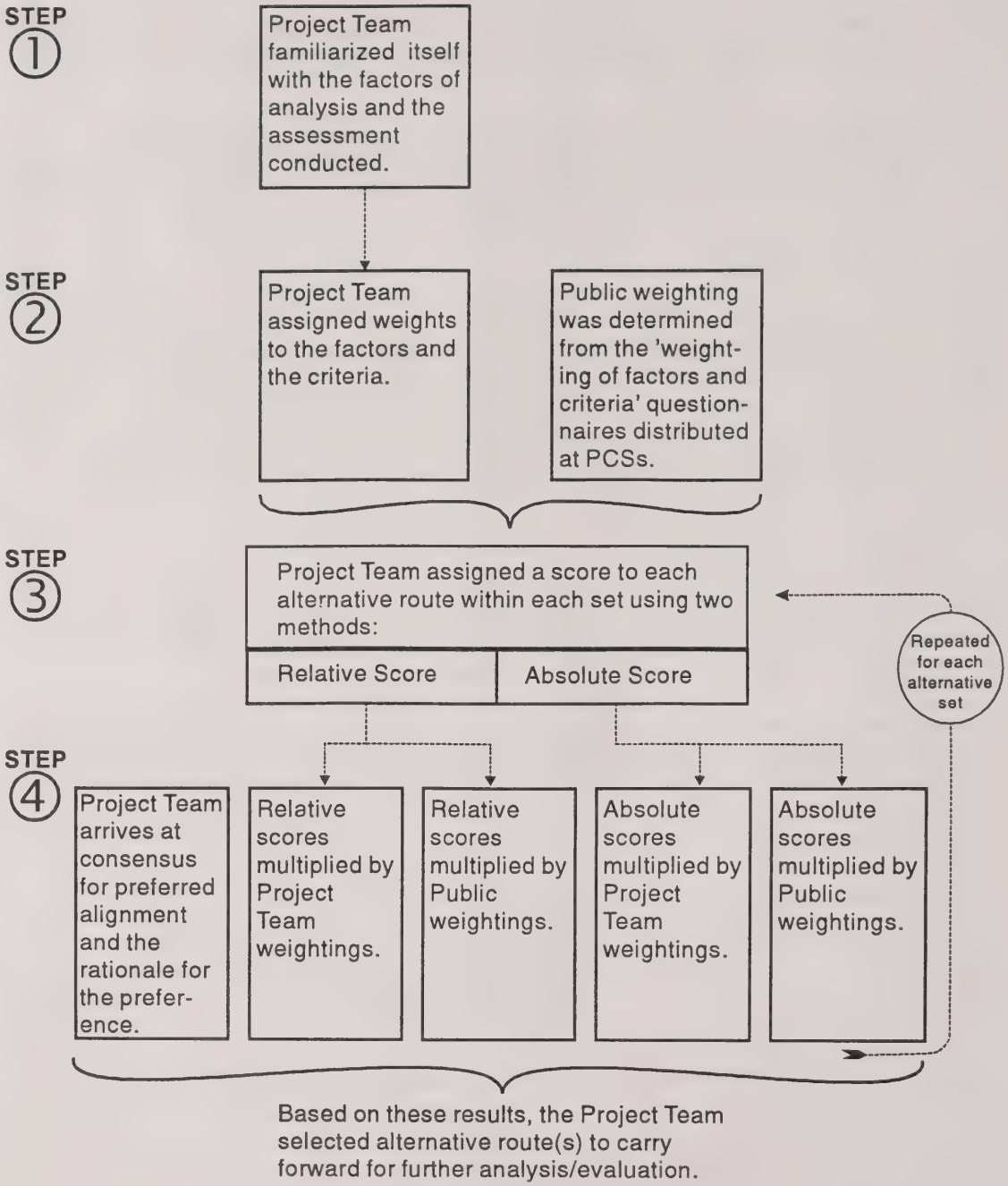
Stage 1 - evaluation of 10 alternative sets comprised of 43 route segments

Stage 2 - evaluation of route segments carried forward

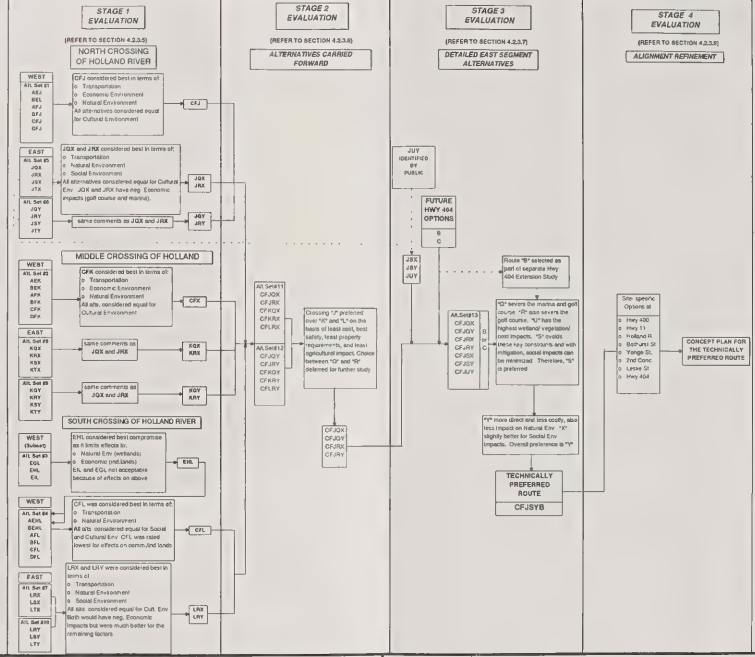
Stage 3 - further evaluation of the east section alternatives including future Highway 404 options to determine the Technically Preferred Route

Stage 4 - evaluation of alignment refinements to the Technically Preferred Route

The evaluation procedure described in the previous section was carried out for each stage of the evaluation. The process describing how the Technically Preferred Route was chosen is shown graphically in Exhibit 4-9.



HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	ANALYSIS AND EVALUATION PROCEDURE	EXHIBIT 4-8



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EVALUATION SUMMARY OF ROUTE ALTERNATIVES

EXHIBIT 4-9

Exhibit 4-10 highlights the results of both the numerical scoring (Project Team and Public weightings included) and the trade-off methods of the evaluation for Stage 1; Exhibits 4-11 and 4-13 highlight results of Stage 2 and 3, respectively. It should be noted that the trade-off summaries presented only highlight those factors/criteria that "made the difference" in identifying the preferred route segment. Where a factor/criterion is not specifically addressed, it generally did not form a significant distinction between alternatives.

4.2.3.5 Stage 1

Stage 1 considered 10 sets of route segment alternatives. Because of the large number of route segments being considered, functionally similar segments were grouped together in 2 distinct areas:

- West of the Holland River (route segments linking points A-I); and
- East of the Holland River (route segments linking points M-Y).

The organization of functionally similar segments aided in determining the best routings west of the Holland River (Sets 1-4) and east of the Holland River (Sets 6-10).

Results of the first stage evaluation identified the preferred route segments for each of the 10 alternative sets. The preferred route segment carried forward were evaluated further in Stage 2 (Section 4.3.4.5) to determine which alternatives would be considered best for crossing of the west branch of the Holland River (route segments through points J, K, and L).

The Technical Reports for each of the factors, 1:10,000 base mapping, and other available resource mapping (e.g. agricultural) were used extensively to compile the analysis charts used in the evaluation of alternatives (refer to Appendix D for the analysis charts used for the evaluation).

While public and other input was generally of the view that the alternative routes shown during the second round of review (spring 1994) were comprehensive, one additional routing was put forward as a means of avoiding impact (noise, visual) on residences in the Grandview Estates (Eighth Line east of Yonge Street) area. This was an easterly extension of the mid-concession route segment D (see Exhibit 4-5), skirting to the north of the public use portion of the Scanlon Creek Conservation Area, then turning south along the CN line to join the other routes at the K or L crossings (see Exhibit 4-5).

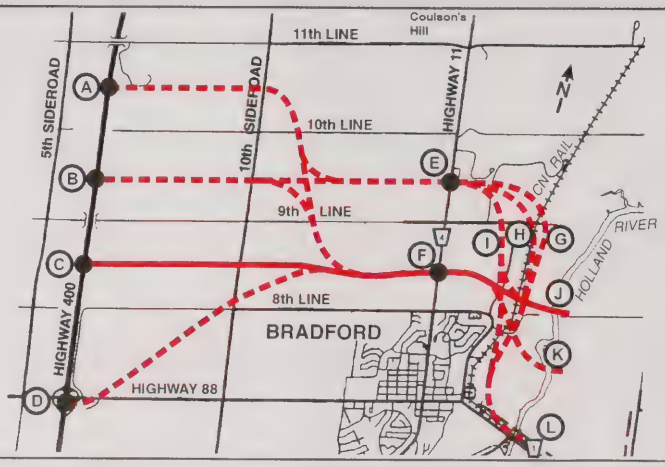
The Project Team determined that the route would indeed skirt residential areas to the greatest extent possible, but it had significant drawbacks, among them the distance of the Yonge Street interchange from Bradford's Commercial Centre, the permanent severance of the Conservation Area lands, its incompatibility with the optimum Holland River crossing option "J", the capital cost premium associated with a longer facility than the others, and the unsuitability (due to out-of-way travel) of the route for travellers from the east oriented towards southbound Highway 400 and vice versa. When the alternative and the Project Team's rationale for setting it aside was reviewed with the public at meetings in mid-1994, there was no dissent with not carrying it forward to the detailed Stage 2 evaluation.

As noted above, the preferred route segments (alternatives) from Stage 1 were then carried forward to the Stage 2 evaluation. Exhibit 4-10 summarizes the results of the numerical evaluation and the evaluation trade-off rationale (qualitative evaluation) for each set considered.

Alternative Set #1
North Crossing - West Segment (AEJ, BEJ, AFJ, BFJ, CFJ, DFJ)
Preferred Alternative: CFJ

Results of the Numerical Evaluation - CFJ		
	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
CFJ was considered to be significantly better than the others overall with cost (7-22% less expensive to construct) and traffic operations (shortest route) being the deciding factors

Natural Environment
CFJ and DFJ would be similar and better than the others overall because there were greater potential effects on fisheries (permeable soils), wildlife (minor encroachment on green spaces/linkages), vegetation (high quality forest removed), and groundwater with AEJ, BEJ, AFJ, and BFJ. CFJ also avoids the Scanlon Creek Conservation Area.

Social Environment
CFJ was considered to be marginally better than the others overall primarily for community effects (fewest number of houses removed; good emergency response time). Although BEJ was considered better for noise (8 houses over 55 dBA compared to 10 houses, respectively) and aesthetics, these two factors could be mitigated for CFJ.

Economic Environment
CFJ was considered to be marginally better than BFJ because of farm operation effects and better than the others for both agricultural (the others impact specialty crops) and commercial/industrial effects.

Cultural Environment
CFJ and BEJ would be similar and better than the others because of proximity to historically significant areas being the deciding factor.

Trade-Off Summary

CFJ was determined to be better than or equal to the other route segments overall for each criterion and was ranked highest for the relative and absolute scoring (for both the Public and Project Team weighting). Effects on fisheries, wildlife, vegetation, groundwater, farming operations/agricultural land, and industrial/commercial lands were the primary considerations. BFJ was considered to be similar to CFJ for its positive/negative effects (absolute score) but not as good for the relative comparison scoring. Therefore CFJ was carried forward to the Stage 2 evaluation.

Alternative Set #2

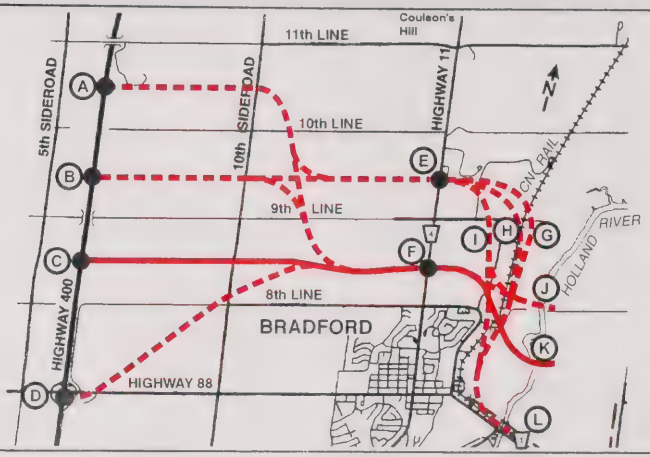
Middle Crossing - West Segment (AEK, BEK, AFK, CFK, DFK)

Preferred Alternative: CFK

Results of the Numerical Evaluation - CFK

	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
CFK was considered to be significantly better than the others overall with cost (5-20% less expensive to construct) and traffic operations (shortest route) being the deciding factors.

Natural Environment
CFK and DFK would be similar and better than the others overall because there were greater potential effects on fisheries (permeable soils), wildlife (minor encroachment on green spaces/linkages), vegetation (high quality forest removed), and groundwater with AEK, BEK, AFK, and BFK

Social Environment
CFK was considered to be marginally better than the others overall primarily for community effects (fewest number of homes removed; good emergency response time). Although BEK was considered better for noise (6 houses of 55 dBA compared to 8 houses, respectively) and aesthetics, these two factors could be mitigated for CFK.

Economic Environment
CFK was considered to be marginally better than BFK because of farm operation effects and better than the others for both agricultural (the others impact specialty crops) and commercial/industrial effects

Cultural Environment
CFK and BEK would be similar and better than the others because of proximity to historically significant areas being the deciding factor.

Trade-Off Summary

This set of route segments is very similar to Alternative Set #1 and considered to have the same potential effects. Effects on fisheries, wildlife, vegetation, groundwater, farming operations/agricultural land, and industrial/commercial lands were the primary considerations. Therefore, CFK was carried forward as it would be better than or equal to the other route segments overall for each criterion and was ranked highest for the relative and absolute scoring (for both the Public and Project Team weighting).

Alternative Set #3

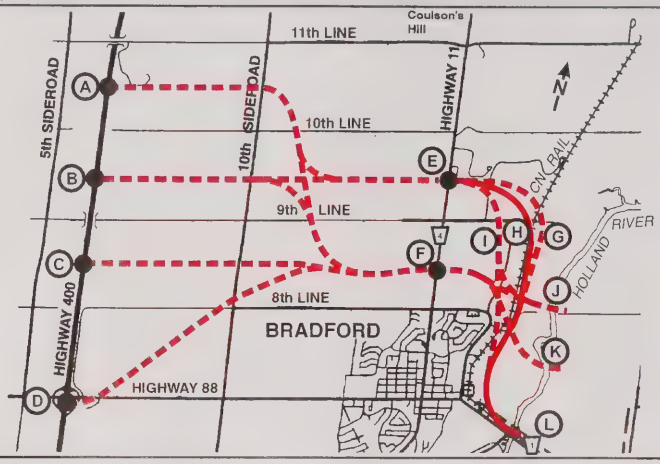
South Crossing - West Subsegment (EGL, EHL EIL)

Preferred Alternative: EHL

Results of the Numerical Evaluation - EHL

	Public Weighting	Project Team Weighting
Relative Score Ranking	2nd	2nd
Absolute Score Ranking	2nd	2nd

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
The three alternatives were considered similar for Transportation operations and compatibility. EIL would be significantly more expensive than the others and was considered to be unacceptable.

Natural Environment
EIL would be better than the others for effects on wildlife, wetlands, and vegetation (significantly less effects on forested areas and habitat). EGL would be unacceptable for its effects on the Holland River wetlands (loss of wetland - 22.7 ha compared to 10.7 ha for EHL and 4.2 ha for EIL).

Social Environment
EGL was considered marginally better for all criteria, although effects with EHL would be very similar.

Economic Environment
EIL was considered to be unacceptable for its effects on the economic areas on the north and east sides of Bradford (it would sever 8.5 ha of industrial land). EGL would be marginally better than EHL for effects on the same economic areas.

Cultural Environment
The alternatives would be equal for their effects.

Trade-Off Summary

EGL was considered better than the other alternatives for the Social and Economic Environments; EIL was considered best for the Natural Environment; EHL was considered best for Transportation.

Based on the relative and absolute scoring EGL was ranked marginally higher than EHL (EHL was ranked 2nd in scoring), however its potential effects on the Holland River wetlands made the alternative unacceptable in the Project Team's opinion. Similarly, EIL was considered unacceptable because of its high cost and negative effects to the Economic Environment. EHL would provide the best compromise for the above-noted effects. Therefore, EHL was carried forward to the Stage 2 evaluation.

Alternative Set #4

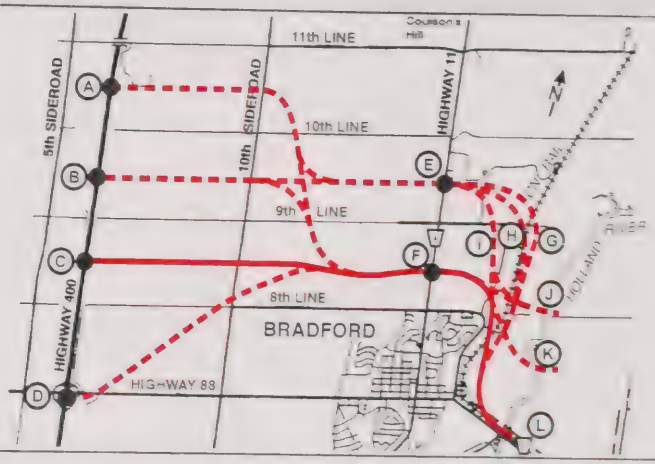
South Crossing - West Segment (AEL, BEL, AFL, BFL, CFL, DFL). Includes route segment EHL identified in Set #3.

Preferred Alternative: CFL

Results of the Numerical Evaluation - CFL

	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
CFL was considered equal to and better than the others for all factors as it would be the most direct route (0.5 km shorter than other alternatives) from Highway 400 and would reroute traffic from the Highway 88/11 corridor most effectively

Natural Environment
CFL would be equal to or better than the others for all factors except wildlife (DFL marginally better - 12.9 ha of forested area affected compared to 16.8 ha and vegetation - 32 ha high quality woodlot affected compared to 2.8 ha). The main differences would be for effects on wildlife, groundwater (CFL affects no wells: 9-30 wells affected with the others) and vegetation (effects on forested areas)

Social Environment
BEL would be marginally better than the others for noise and community effects. Between 26 (BEL) and 37 (DFL) houses would experience noise levels over 55 dBA. BEL would remove 5 homes compared to 7-10 with the others

Economic Environment
CFL would be better than the others for effects on agriculture (least effects on farm operations) although AEL and BEL would be better than the others for effects on industrial and commercial areas as they would not affect any of the industrial areas (7.2 ha severed for the others).

Cultural Environment
All alternatives were considered to be equal.

Trade-Off Summary

CFL was determined to be better than or equal to the other alternatives for Transportation (shorter and operationally better) and Natural Environment (equal with DFL; DFL better for wildlife and vegetation but much worse for groundwater). BEL was considered to be best for the Social (homes removed and noise) and Economic Environments (no impact on industrial area in Bradford). The two were considered best and equal for the Cultural Environment. CFL was ranked highest for the relative and absolute scoring (for both Public and Project Team weighting) and scored significantly higher than BEL overall because BEL would be poor for the heavily weighted Natural Environment factor, therefore CFL was carried forward to the Stage 2 evaluation

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	STAGE 1 EVALUATION ALTERNATIVE SET 4	EXHIBIT 4-10(d)

Alternative Set #5

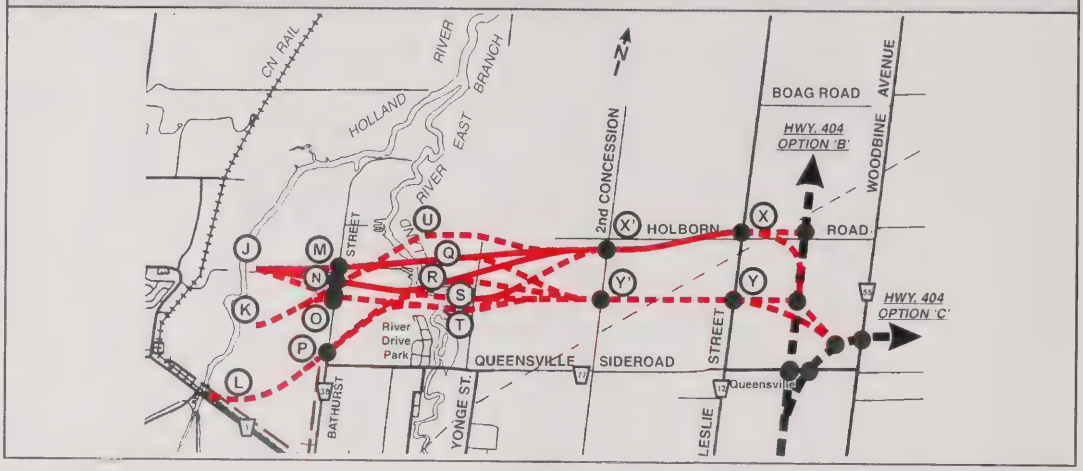
North Crossing - East Segment
(JQX, JRX, JSX, JTX)

Preferred Alternative: JQX,JRX

Results of the Numerical Evaluation - JQX,JRX

	Public Weighting		Project Team Weighting	
	JQX	JRX	JQX	JRX
Relative Score Ranking	1st	2nd	2nd	1st
Absolute Score Ranking	1st	1st	2nd	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
JQX and JRX would be better than the others primarily for their cost. JSX would be 15% more expensive to construct while JSX and JTX would also have higher operation and maintenance costs.

Natural Environment
JRX would be marginally better than JQX overall because of effect to wetlands (11.8 ha compared to 23.2 ha for Class 1-3 wetlands); similarly JQX would be marginally better than JSX. JTX would have the most impacts with wildlife, wetlands and vegetation (encroachment or severance of 36.2 ha of high quality forest compared to 14-25 ha for JQX and JRX) being the key factors for all the alternatives. Wetland function effects with JQX and JRX would be minor (no net loss).

Social Environment
JQX would be better than the others for community and noise effects (JRX similar). Both JSX and JTX would have greater potential noise impacts and disruption to the River Drive Park/Yonge Street communities because of their proximity to these areas.

Economic Environment
JSX and JTX would be better than the others as JQX and JRX would significantly impact both the marina and the golf course with a property severance. Of the latter, each alternative would affect approximately 30 ha of specialty crop.

Cultural Environment
All alternatives would be equal.

Trade-Off Summary

JQX and JRX are similar alternatives and were determined to be equal and better than the others for Transportation and the Natural and Social Environments. Cost, impacts to wetlands (Class 1-3), wildlife and vegetation (impacts to forested areas), and noise (proximity to residential areas) were the primary considerations especially in the vicinity of the Holland River. Scores for JQX and JRX were similar (ranked first or second overall for both the Public and Project Team weighting). JSX and JTX, also similar, were considered better than JQX and JRX for Economic Environmental effects (impacts to golf course and marina). They were all equal for effects on the Cultural Environment. JSX and JTX scored poorly for the heavily weighted factors of the Social Environment and although they scored better for Economic Environment, effects on the community and noise were considered to be more significant. Therefore JQX and JRX were carried forward to the Stage 2 evaluation.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	**STAGE 1 EVALUATION ALTERNATIVE SET 5**	**EXHIBIT 4-10(e)**

Alternative Set #6

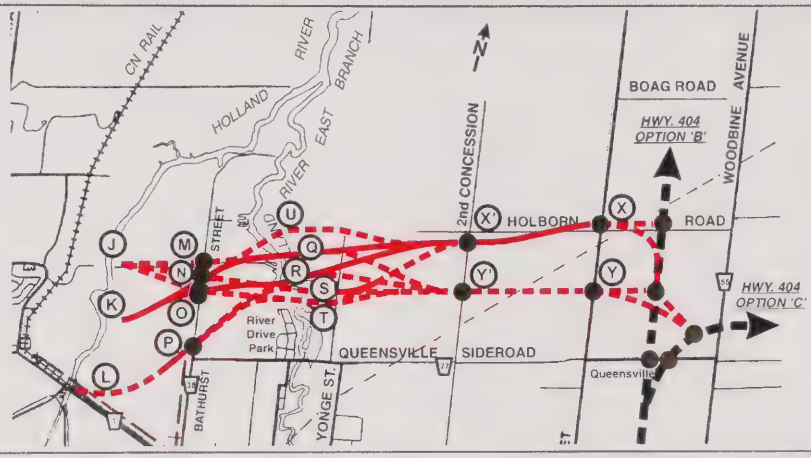
Middle Crossing - East Segment
(KQX, KRX, KSX, KTX)

Preferred Alternative: KQX,KRX

Results of the Numerical Evaluation - KQX,KRX

	Public Weighting		Project Team Weighting	
	KQX	KRX	KQX	KRX
Relative Score Ranking	1st	2nd	2nd	1st
Absolute Score Ranking	1st	1st	2nd	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
KQX and KRX would be better than the others primarily for their cost. Construction costs for KSX would be 15% higher than KQX and KRX.

Natural Environment
KRX would be marginally better than KQX overall because of effects to wetlands (12.4 ha compared to 19.8 ha of Class 1-3 wetlands); similarly KQX would be marginally better than KSX. KTX would have the most impacts with wildlife (encroachment of severance of 49.4 ha of habitat compared to 34-36 ha for the others), wetlands and vegetation being the key factors for all the alternatives. Wetland function effects with KQX and KRX would be minor (no net loss).

Social Environment
KQX would be better than the others for community and noise effects (KRX similar). Both KSX and KTX would have greater potential noise impacts and disruption to the River Drive Park/Yonge Street communities because of their proximity to these areas.

Economic Environment
KSX and KTX would be better than the others as KQX and KRX would significantly impact both the marina and the golf course with a property severance making the golf course unviable for both KQX and KRX. KQX would likely make the marina unviable.

Cultural Environment
All alternatives would be equal.

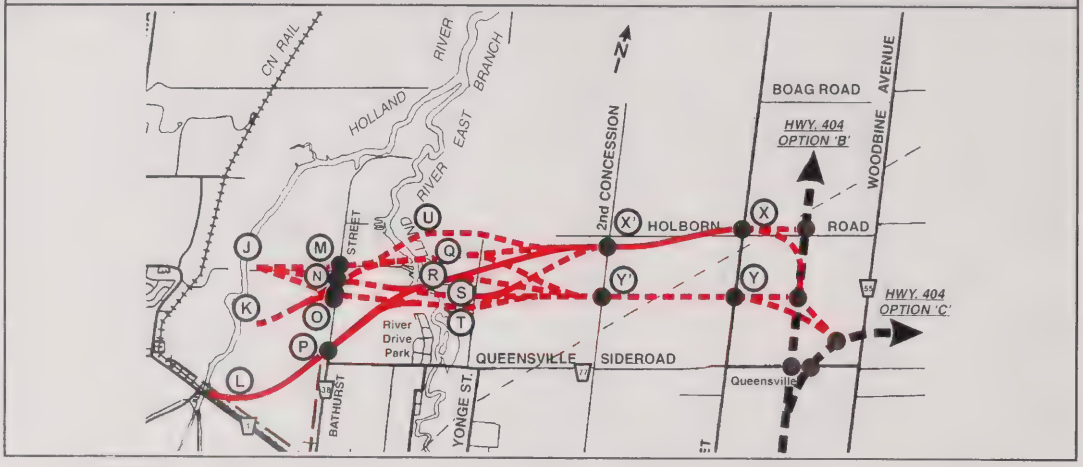
Trade-Off Summary

This set of route segments is very similar to Alternative Set #5 and considered to have the same potential effects (and therefore relative/absolute scoring). That is, cost, impacts to wetlands (Class 1-3), wildlife and vegetation (impacts to forested areas), and noise (proximity to residential areas) were the primary considerations especially in the vicinity of the Holland River. KQX and KRX scored similarly and overall higher than KSX and KTX. Also similar would be KSX and KTX's higher effects on the Social Environment (noise) even though they scored better than KQX and KRX for effects on the Economic Environment (marina and golf course). Therefore, KQX and KRX were carried forward to the Stage 2 evaluation.

Alternative Set #7
South Crossing - East Segment (LRX, LSX, LTX) Preferred Alternative: LRX

Results of the Numerical Evaluation - LRX		
	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
LRX would be better than the others primarily for its cost. LSX would cost approximately 13% more to construct and 25% more to maintain; 2% more and 10% more, respectively, for LTX.

Natural Environment
LRX would be marginally better than LSX (45.6 ha of forest affected compared to 36.8 ha for LRX). LTX would have the most impacts with wildlife, wetlands and vegetation (12.8 ha of ESA affected compared to 10.3 ha for LRX and 3.1 ha for LSX) being the key factors for all the alternatives. Wetland function effects with LRX would be minor (no net loss).

Social Environment
LRX would be better than the others for community and noise effects (20 houses with noise levels >55 dBA compared to 23 and 29 respectively for LSX and LTX). Both LSX and KTX would have potential noise impacts and disruption to the River Drive Park/Yonge Street communities because of their close proximity to these areas.

Economic Environment
LSX and LTX would be better than LRX which would significantly impact both the marina and the golf course likely making the golf course unviable. Each would be similar for agricultural effects, 35-37 ha of specialty crop directly affected.

Cultural Environment
All alternatives would be equal.

Trade-Off Summary

This set of alternatives would have the same relative potential effects as the previous two sets (similar to sets 5 and 6 the potential effects to the natural environment and social environment were primary considerations in the vicinity of the Holland River). LRX was ranked highest for the relative and absolute scoring (for both the Public and Project Team weighting) and therefore was carried forward to the Stage 2 evaluation.

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	STAGE 1 EVALUATION ALTERNATIVE SET 7	EXHIBIT 4-10(g)

Alternative Set #8

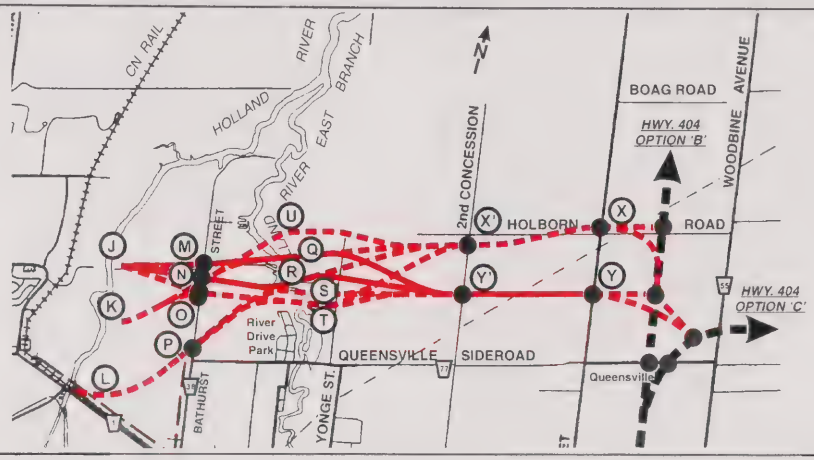
North Crossing - East Segment (South) - (JQY, JRY, JSY, JTY)

Preferred Alternative: JQY,JRY

Results of the Numerical Evaluation - JQY,JRY

	Public Weighting		Project Team Weighting	
	JQY	JRY	JQY	JRY
Relative Score Ranking	2nd	1st	2nd	1st
Absolute Score Ranking	1st	1st	2nd	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
JQY and JRY would be better than the others primarily for their cost. JSY would be up to 13% more expensive than the others.

Natural Environment
JRY would be marginally better than JQY overall because of wetland effects (8.9 ha compared to 21.4 ha for Class 1-3 wetlands); similarly JQY would be marginally better than JSY. JTY would have the most impacts with wildlife (33.6 ha of forested vegetation affected compared to 26-31 ha for the others), wetlands and vegetation being the key factors for all the alternatives. Wetland function effects with JQY and JRY would be minor (no net loss).

Social Environment
JQY would be better than the others for community and noise effects (JRY similar) with the least number of homes affected (17-24 houses) Both JSY and JTY would have greater potential noise impacts and disruption to the River Drive Park/Yonge Street communities because their proximity to these areas. JSY would affect 42 houses; JTY, 84 houses.

Economic Environment
JSY and JTY would be better than the others as JQY and JRY would significantly impact both the marina and the golf course. JQY would likely make both unviable. JRY would make the golf course unviable.

Cultural Environment
All alternatives would be equal.

Trade-Off Summary

JQY and JRY are considered to be similar for potential effects and ranked highest for the relative and absolute scoring (ranked first or second overall for both the Public and Project Team weighting). They were considered better than JSY and JTY for Transportation (cost) and the Natural (impacts to wildlife, vegetation, and wetlands) and Social Environments (noise impacts). All were equal for the Cultural Environment. JSY and JTY scored higher than JQY and JRY for the Economic Environment however, the benefits to the golf course and marina were outweighed by the more significant noise impacts and overall effects to the community. Therefore, JQY and JRY were carried forward to the Stage 2 evaluation.

Alternative Set #9

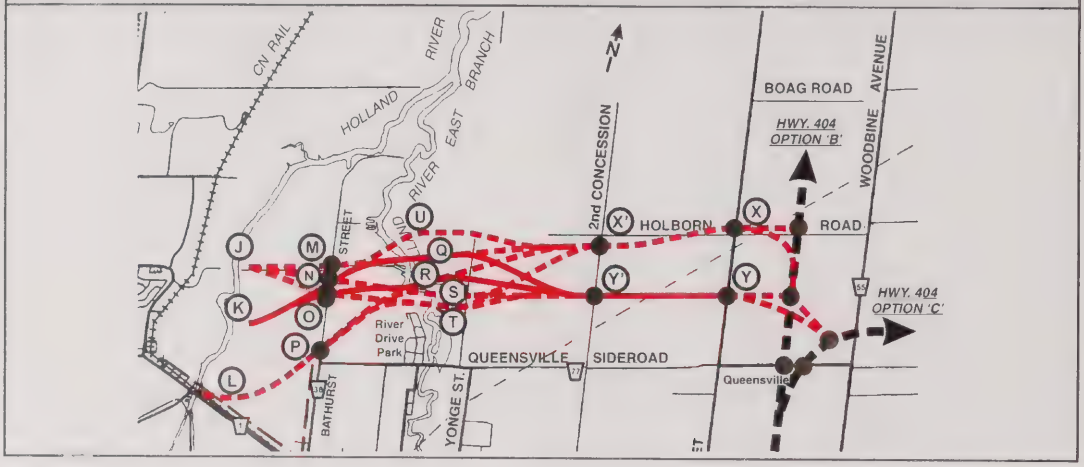
Middle Crossing - East Segment
South - (KQY, KRY, KSY, KTY)

Preferred Alternative: KQY,KRY

Results of the Numerical Evaluation - KQY,KRY

	Public Weighting		Project Team Weighting	
	KQY	KRY	KQY	KRY
Relative Score Ranking	2nd	1st	2nd	1st
Absolute Score Ranking	1st	1st	2nd	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
KQY and KRY would be better than the others primarily for their cost. KSY would be up to 13% more expensive than the others to construct.

Natural Environment
KRY would be marginally better than KQY overall because of wetland effects (9.6 ha compared to 16.8 ha for Class 1-3 wetlands); similarly KQY would be marginally better than KSY. KTY would have the most impacts with wildlife (40.7 ha of forested vegetation affected compared to 34.4-38 ha for the others), wetlands and vegetation being the key factors for all the alternatives. Wetland function effects with KQY and KRY would be minor (no net loss).

Social Environment
KQY would be better than the others for community and noise effects (KRY similar) with significantly less homes affected (20-30 houses). Both KSY and KTY would have greater potential noise impacts and disruption to the River Drive Park/Yonge Street communities because of their proximity to those areas (45 houses affected with KSY; 84 houses with KTY).

Economic Environment
KSY and KTY would be better than the others as KQY and KRY would significantly impact both the marina and the golf course. KQY would make the marina and golf course unviable; KRY would make the golf course unviable.

Cultural Environment
All alternatives would be equal.

Trade-Off Summary

The potential effects for these alternative routes would be the same as the previous set, i.e. KQY and KRY were ranked highest for the relative and absolute scoring (for both the Public and Project Team weighting) and were considered best for effects on Transportation (cost) and the Social (noise impacts) and Natural Environments (wildlife, vegetation and wetlands). All were equal for the Cultural Environment. Similar to the previous set KSY and KTY were considered better for effects on the Economic Environment however these benefits were outweighed by the higher noise impacts and effects to the community. Therefore, KQY and KRY were carried forward to the Stage 2 evaluation.

Alternative Set #10
South Crossing - East Segment (South) - (LRY, LSY, LTY) Preferred Alternative: LRY

Results of the Numerical Evaluation - LRY		
	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan

Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
LRY would be better than the others primarily for its cost. LSY would be 12% more expensive to construct than LRY.

Natural Environment
LRY would be marginally better than LSY (30.9 ha of high quality forest affected compared to 34.4 ha and 7.3 ha affected compared to 10 ha affected for Class 1-3 wetlands). LTY would have the most impacts with wildlife, wetlands and vegetation being the key factors for all the alternatives. Wetland function effects with LRY would be minor (no net loss) compared to moderate for LSY.

Social Environment
LRY would be better than the others for community (removal of 8 homes compared to 10 and 11 homes for LSY and LTY) and noise effects (significantly less number of homes affected; 40 for LRY, 55 for LSY, 96 for LTY). Both LSY and KTY would have greater potential noise impacts and disruption to the River Drive Park/Yonge Street communities because of their close proximity to these areas

Economic Environment
LSY and LTY would be better than LRY. LRY would significantly impact both the marina and the golf course with a property severance.

Cultural Environment
All alternatives would be equal.

Trade-Off Summary

The relative potential effects for this set of alternative routes would be the same as Alternative Sets #8 and #9. LRY was considered better than the others primarily for cost, vegetation (high quality forest impacts), wetland (loss of function and area impacted), community effects (homes removed), and noise. LSY and LTY would be better for effects on the marina and golf course; however, LRY was ranked highest in the relative and absolute scoring (for both the Public and Project Team weighting) and therefore, was carried forward to the Stage 2 evaluation.

Summary for the Stage 1 Evaluation

The preferred route segments identified in the Stage 1 evaluation and then carried forward to the Stage 2 evaluation are listed below.

	Alternative Set	Preferred Route Segment
1.	North Crossing - West Segment	CFJ
2.	Middle Crossing - West Segment	CFK
3.	South Crossing - West Subsegment	EHL
4.	South Crossing - West Segment	CFL
5.	North Crossing - East Segment (North)	JQX, JRX
6.	Middle Crossing - East Segment (North)	KQX, KRX
7.	South Crossing - East Segment (North)	LRX
8.	North Crossing - East Segment (South)	JQY, JRY
9.	Middle Crossing - East Segment (South)	KQY, KRY
10.	South Crossing - East Segment (South)	LRY

4.2.3.6 Stage 2

The Stage 2 evaluation involved the comparison of the alternatives carried forward (at the same level of detail outlined in Stage 1) to determine which alternatives would be considered best for the crossing of the west branch of the Holland River. That is, a comparison between the north crossing alternatives (segment J), middle crossing alternatives (segment K), and the south crossing alternatives (segment L). Because of the large number of route segments carried forward from Stage 1, the intent of the evaluation was to also determine the best route alternative for the crossing of the east branch of the Holland River (Q vs R) and the best route alternative for the terminus at future Highway 404 (X vs Y). However, this part of the evaluation was deferred until the third stage because of the need for more detailed information to be generated for the potential effects on the natural environment and both the marina and the golf course north of Queensville Sideroad adjacent to the east branch of the Holland River.

Therefore, Alternative Sets 11 (North Highway 404 Terminus) and 12 (South Highway 404 Terminus) were identified for the Stage 2 evaluation and only considered the crossing of the west branch of the Holland River (north (J), middle (K), south (L)). Exhibit 4-11 summarizes the results of the evaluation of Alternative Sets 11 and 12.

Alternative Set #11

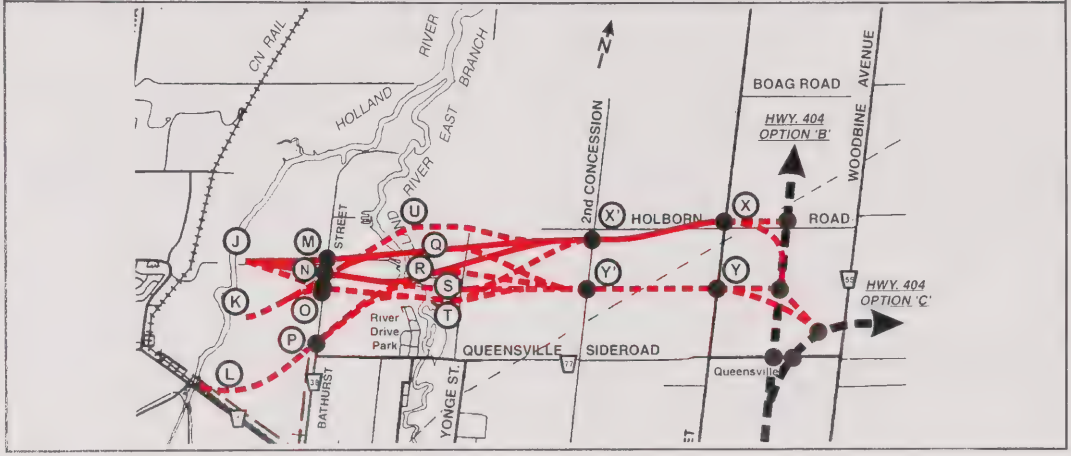
East River Crossings - North Terminus
(CFJ*X, CFK*X, CFL*X)
*** Either Q or R; determined in Stage 3**

Preferred Alternative: CFJ*X

Results of Numerical Evaluation - CFJ*X

	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
The J crossing was considered to be better than both the K and L crossings primarily due to safety and cost. The K crossing would be up to 14% more expensive to construct than J.

Natural Environment
The J crossing was considered to be better than both the K and L crossings (K and L would impact between 5 and 10 more watercrossings) except for the wetland factor where L would be slightly better for loss of wetland (7.4 ha compared to 10-19 ha for K and J).

Social Environment
The J and K crossings were considered equal for both effects on adjacent communities and noise and better than the L crossing. L would affect 130 homes compared to 45-60 for K and J. The J crossing was considered to be marginally better than K for aesthetics.

Economic Environment
J would be better than the others primarily due to the minimal impacts to agricultural areas. J would remove 78-83 ha of Class 1-4 lands compared to 89-101 ha for the others.

Cultural Environment
All the alternatives were considered to be equal except for the L crossing which would be slightly less desirable for the historical factor.

Trade-Off Summary

The CFJ*X (north crossing) alternatives were ranked highest in the relative and absolute scoring (for both the Public and Project Team weighting). CFJ*X was considered best for Transportation (safety and cost) and the Social (marginally better than the K crossing for aesthetics, better than L for noise) and Economic Environments (removal of Class 1-4 agricultural lands) and better than CFK*X for all factors. Only CFL*X was considered slightly better than CFJ*X for wetland effects, however, by locating the crossing in an area of previous disturbance and using structures to span the wetlands, the net impact can be kept to a minimum.

Alternative Set #12

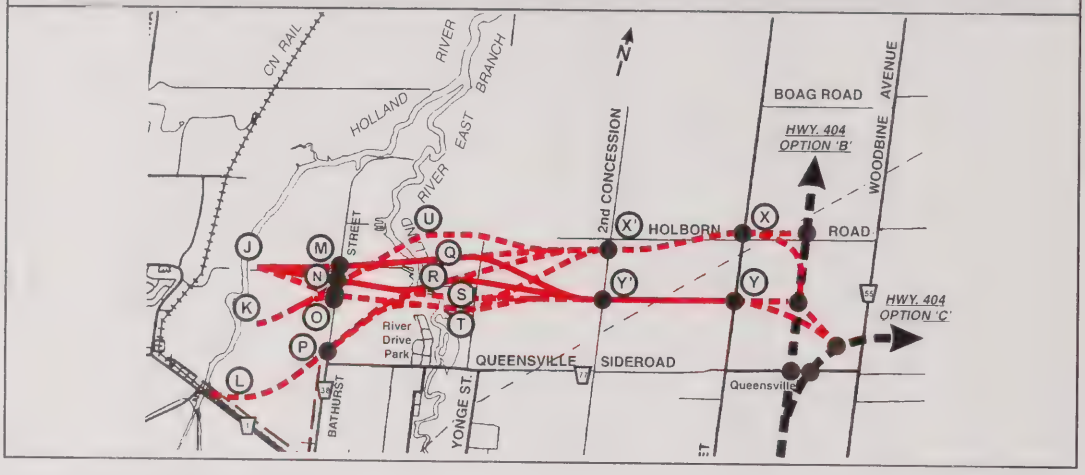
East River Crossings - South Terminus
(CFJ*Y, CFK*Y, CFL*Y)
* Either Q or R; determined in Stage 3

Preferred Alternative: CFJ*Y

Results of the Numerical Evaluation - CFJ*Y

	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (refer to Appendix D for Analysis Charts)

Transportation
The J crossing was considered to be better than both the K and L crossings primarily due to safety and cost. K and L would be up to 14% more expensive to construct than J.

Natural Environment
The J crossing was considered to be better than both the K and L crossings except for the wetland factor where L would be slightly better. J would affect 13 or 14 watercrossings compared to 18-25 for the others and less habitat, 33-37 ha compared to 45 ha.

Social Environment
The J and K crossings were considered equal for both effects on adjacent communities and noise and better than the L crossing. J would remove more homes than K but have lower noise impacts as a result. The L crossing would have significantly higher noise effects. The J crossing was considered to be marginally better than K for aesthetics.

Economic Environment
J would be better than the others primarily due to the minimal impacts to agricultural areas. J would remove 75-78 ha of Class 1-4 land compared to 82-102 ha for K and L.

Cultural Environment
All the alternatives were considered to be equal except for the L crossing which would be slightly less desirable for the historical factor.

Trade-Off Summary

The CFJ*Y (south crossing) alternatives were ranked highest in the relative and absolute scoring (for both the Public and Project Team weighting). CFJ*Y was considered best for Transportation (safety and cost) and the Social (better than the L crossing for noise and marginally better than K for aesthetics) and Economic Environments (removal of Class 1-4 agricultural lands) and better than CFK*Y for all factors. Under the natural environment, only CFL*Y was considered slightly better than CFJ*Y for wetland effects, however, by locating the crossing in an area of previous disturbance and using structures to span the wetlands, the net impact can be kept to a minimum.

Summary for the Stage 2 Evaluation

Therefore the following route alternatives were carried forward to the Stage 3 evaluation:

- CFJQX
- CFJQY
- CFJRX
- CFJRY

4.2.3.7 Stage 3

The Stage 3 evaluation was required to determine the best route segment east of the Holland River. It was carried out following the acquisition of more detailed information about the natural environment adjacent to the Holland River, as well as economic and operational data regarding Albert's Marina and the Silver Lakes Golf Course. More detailed digitized mapping also became available at this stage in the evaluation, and completion of the Second Round of Public Involvement provided the Project Team with an understanding of area residents' views regarding many of the alternatives.

Based on this additional information the following route segments east of the Holland River were added to the evaluation.

1. A new alternative, alternative segment U, was identified (see Exhibit 4-12). A route in this location was not previously considered as a reasonable alternative for crossing the east branch of the Holland River because of significant wetland effects. However, many comments from the public had been received suggesting a route north of the golf course.

   Therefore, this alternative was included in the Stage 3 evaluation and made up alternative route CFJUY. CFJUX was not included because effects on wetlands east of the golf course would be worse than CFJUY.

2. Upon review of the more detailed information made available regarding the marina and golf course, the Project Team determined it would not be appropriate to only evaluate alternatives which would sever these two facilities. The alternative segment S would not sever these facilities and scored higher than the alternative segment T (Stage 1 evaluation), therefore, it was reconsidered in the evaluation to make alternative routes CFJSX and CFJSY (see Exhibit 4-12).

3. The Technically Preferred Route identified in Stage 3 would require a connection to Highway 404 compatible with the Highway 404 study's recommendations. At the beginning of the Stage 3 evaluation, there were two Highway 404 options to be considered, B and C. Therefore, the options were incorporated into the evaluation.

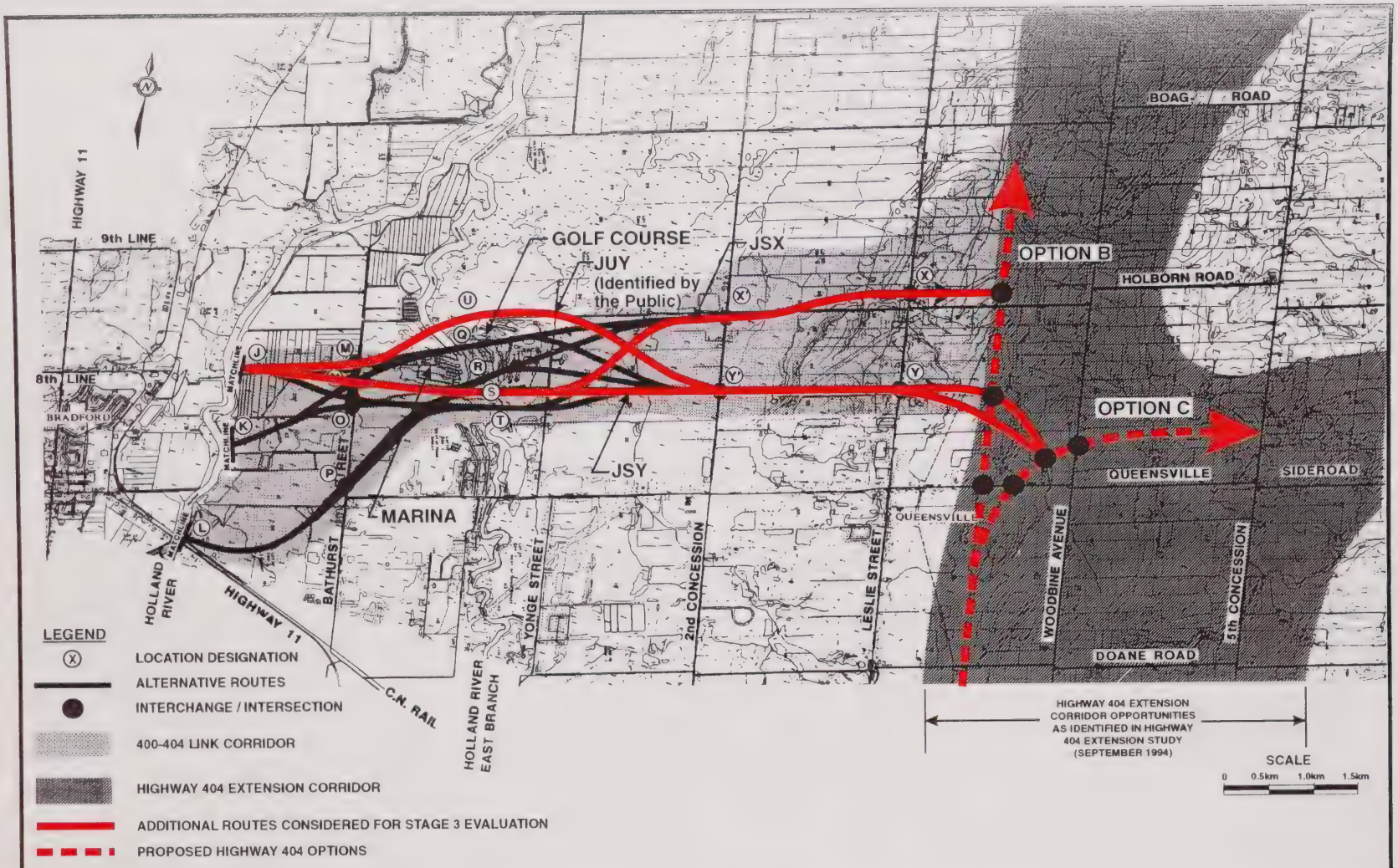
400-404 Link Route Alternatives		**Highway 404 Alternatives**
• CFJQX	*with*	B or C
• CFJQY	*with*	B or C
• CFJRX	*with*	B or C
• CFJRY	*with*	B or C
• CFJSX	*with*	B or C
• CFJSY	*with*	B or C
• CFJUY	*with*	B or C

The above-noted alternatives were evaluated as one set, Alternative Set 13. The result of the evaluation would in short, identify the Technically Preferred Route as it would determine: i) the best crossing of the east branch of the Holland River, considering the effects on the golf course and marina (either Q, R, S or U); and ii) the best connection of the new route to future Highway 404 (either the north terminus X or the south terminus Y). Option B and C would be evaluated but a choice was the separate responsibility of the Project Team studying the extension of Highway 404. Exhibit 4-13 summarizes the results of the evaluation of Alternative Set 13.

Summary for the Stage 3 Evaluation

Results of the evaluation as documented in Exhibit 4-13 and in Appendix D indicated alternative JSYB as the preferred route east of the Holland River. The key trade-offs which emerged in this stage of the evaluation are as follows:

1. **Q, R, S and U Segments**
   Based on available information the second stage of evaluation indicated that alternatives Q and R were preferred over S and U. However, using the more detailed natural environment and economic environment information, including more detailed plans, it was determined that the difference between Q, R and S would be nominal for natural environment effects. Most important, however, would be the economic impacts associated with Q and R because Q would sever the golf course and the marina, while R would sever the golf course. These impacts to the golf course and marina, upon re-evaluation were considered to outweigh the potential community and noise effects associated with S. It was the Project Team's opinion that, with mitigation, the impacts to the social environment could be minimized. Therefore, the S segment (when connected to either X or Y) was considered better than Q and R; and similar to before, S was considered better than U because U would have significant effects on the area's wetlands and vegetation, and would be the most expensive. The S segment would only have minimal impacts to the golf course and the marina, and would be the least expensive.



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

CONSIDERATIONS FOR STAGE 3 EVALUATION

EXHIBIT 4-12

Alternative Set #13

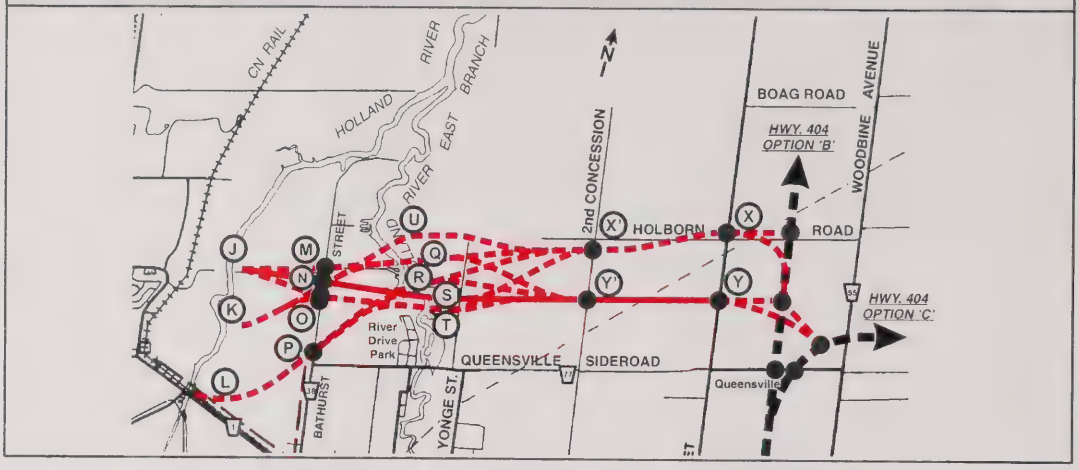
East River Crossing with Highway 404 Options (JQX, JQY, JRX, JRY, JSX, JSY, JUY; all with Highway 404 Option B or C)

Preferred Alternative: JSYB

Results of the Numerical Evaluation - JSYB

	Public Weighting	Project Team Weighting
Relative Score Ranking	1st	1st
Absolute Score Ranking	1st	1st

Key Plan



Trade-Offs (Refer to Appendix D for Analysis Charts)

Transportation

JSY was considered to be equal to or better than the others for all factors, the deciding factors as JSY being best for traffic operations (shortest route, most direct), least expensive (up to 18% less expensive to construct than the others), and better than the Qs for network compatibility (better interchange configuration with Highway 404).

Natural Environment

JSY was considered to be equal to or better than the others for all factors. JSY would be marginally better than JSX and JRY and significantly better than the Qs, JRX and JUY primarily for effects on fisheries, wetlands (Qs encroach on 14-25 ha of Class 1-3 wetland compared to 8.1 ha for JSY; 19.7 ha for JRX; 26 ha for JUY), and wildlife.

Social Environment

JQX would be marginally better than the others overall because it is furthest away from residential areas; however all would have similar effects. The Rs and Ss would have the most significant noise effects. Rs would have 61 or 95 homes with >5 dBA increase; Ss, 64 or 88; compared to the Qs and U which would have 27 or 54, and 42 homes with >5 dBA increase respectively.

Economic Environment

The Ss would be better than the others overall as there would be only minimal impacts to both the marina and the golf course. The Qs would sever both facilities and the Rs would sever the golf course, the severances making the businesses unviable. The Qs would have the most significant agricultural effects but only slightly higher than the others. JSY would directly impact 29.6 ha of specialty crop; the others range from 14-24 ha.

Cultural Environment

JRY and JSY would be marginally better than or equal to the others overall because of their proximity to heritage sites; however effects would only be minor for any of the alternatives.

Trade-Off Summary

See summary of Stage 3 evaluation and Section 4.2.3.7.

2. **X and Y Segments**
   With the S segment preferred, it was determined that overall Y would be better than X because it would be slightly better for effects on Transportation and the Social and Natural Environments. In addition, Y would provide for a more direct route, and be less expensive.
3. **Highway 404 B and C Options**
   During the evaluation, the Bradford Bypass Project Team determined that the best Highway 404 option for connection to the proposed Link would be Option B because it would provide for the shortest connection between the two facilities and therefore would have less property effects and be less expensive. The connection with Option B would also be further north than for C, minimizing impacts to the Queensville community. The Highway 404 Extension study Project Team independently came to a recommendation for Option B over Option C, thereby confirming the common preference for the location of the Link/Highway 404 interchange.

4.2.3.8 Rationale for the Technically Preferred Route

The following summarizes the evaluation of Stages 1, 2, and 3 which resulted in the identification of CFJSYB as the preferred route.

West of the Holland River, the CF route segment combination (when connected to crossings J, K or L) was preferred because:

- it would be the shortest, most direct route and therefore the least expensive as well as the most efficient (in terms of energy, time, etc.) for potential users;
- of the alternatives considered, CF would have the least natural environmental impacts (although very similar with DF). Impacts on fisheries, wildlife habitat (encroachment on green spaces/linkages), high quality forest removal, and groundwater were noted, but the Project Team was satisfied that adequate and appropriate mitigation measures were available;
- it would remove the least number of existing homes and provide the optimum route in terms of emergency response time;
- although BE would have marginally lower noise effects because of its proximity to residential areas, it was determined that potential noise impacts could be mitigated to acceptable levels; and
- it would not be so far away from Bradford as to lose the opportunity to support the local business sector, yet would have minimal direct effects on existing commercial/industrial areas. Impacts on the agricultural community would also be less than those of the alternative routes, as alignment CF largely follows existing lot lines so as to minimize farm severances, thereby maintaining large contiguous parcels of land for agricultural use.

East of the Holland River, the SY route segment combination (when connected to J, K or L) was preferred because:

- it would be the shortest, most direct route making it the least expensive, and would provide the best possible interchange configuration arrangements with Highway 404

- it would be better than the other combinations primarily for effects on fisheries, encroachment and loss of Class 1-3 wetland, and wildlife habitat; through consultation with the Ministry of Natural Resources and detailed field investigation, the Project Team was satisfied that impacts on those aspects of the environment could be adequately and appropriately mitigated;
- although it would have the most significant potential noise impacts (total number of houses affected) due to its proximity to residential areas in East Gwillimbury, this factor did not outweigh the other advantages of the route south of the wetland / golf course complex. The extent of the impact did, however, underline the need for mitigation; and
- it would have the least overall effects on existing major businesses (golf course and marina) and the agricultural community as the alignment follows existing lot lines where possible, minimizes severances, and maintains the viability of agricultural use for the resulting large contiguous parcels of land.

At the Holland River, the J routing was preferred over K and L when connected to the CF (west) and SY (east) route segment combinations because:

- it would be the shortest, most direct crossing, and have the best horizontal geometry making it the least expensive (primarily due to lower structure costs) and the safest route;
- when connected to the west and east segments would impact the least number of watercrossings and the least amount of wildlife habitat;
- although it would not be as good as L for wetland effects, the commitments made by the MTO for treatment of new routes in areas of wetlands kept the significance of this difference to a minimum;
- it would have the lowest noise impacts (although removing more houses) and be better than the others for aesthetics; and
- it would have the least impact on the quantity of Class 1-4 agricultural lands

Finally, in considering all of the potential impacts, the preferred route was reviewed and determined to be a viable and appropriate solution to the problem/opportunity statment when compared against the "Do Nothing (maintain existing conditions)" alternative.

As an overall package the potential transportation benefits for all levels of traffic (provincial, regional and local) and support for municipal development plans offset the potential negative impacts on the Holland River wetland areas, agricultural lands, and adjacent residential communities. Where potential negative impacts remain, the use of appropriate mitigation measures is specified in the Recommended Plan to minimize the net effects.

While the "Do Nothing" alternative would maintain the status quo with regard to the natural environment and agriculture, existing provincial, regional, and local traffic problems will persist and worsen as travel demand continues to grow. Travel times, congestion, out-of-way travel, infiltration of heavy vehicles on local roads, and safety concerns will all continue to worsen under the "Do Nothing" situation and would be relieved by the preferred route. Ultimately, the lack of an adequate transportation network will encumber the ability of the affected municipalities to grow and develop as outlined in their respective Official Plans.

The Technically Preferred Route, CFJSYB, was therefore carried forward to Stage 4.

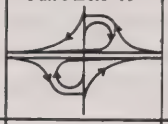
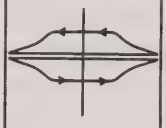
4.2.3.9 Stage 4

The Stage 4 evaluation was carried out to determine where adjustments/refinements could be made to improve the Technically Preferred Route by reducing overall effects as identified by the evaluation criteria. The proposed interchange locations were also confirmed at this stage. Refinements to the preferred route were considered, using additional detailed information where required, including interchange ramp configurations, crossing road profiles, and minor horizontal alignment modifications. Any refinements made do not affect the rationale for selecting CFJSYB as the preferred route over the other route alternatives. The refinements considered were analyzed and compared to the original analysis of the route segment.

Interchanges

Initially, interchanges were considered at all crossing roads between Highway 400 and future Highway 404. From that preliminary concept, a review was carried out which assessed the feasibility, practicality and need for an interchange at each of the crossing roads. Through this assessment which included travel demand analysis (Appendix A) as well as environmental effects the proposed locations for interchanges were finalized. Table 4-1 below summarizes the assessment and the rationale for each crossing road.

Table 4-1: Interchange Location and Rationale

Crossing Road	Jurisdiction	Interchange Warrant	Interchange Type	Rationale
10 Sideroad (Middletown Road)	Bradford West Gwillimbury	No	--	A low volume rural collector road used mostly for local agricultural and residential use. Given its location relative to Highway 400 and Simcoe County Road 4 (Highway 11) an interchange would limit alignment location because of agricultural and community effects. It would provide little benefit to overall network.
Simcoe County Road 4 (Highway 11/Barrie Street)	Simcoe County	Yes	Full Parclo 'A' 	Simcoe County Road 4 (Highway 11) is a major arterial road serving the county and is an integral part of the Bradford road network. Traffic demand will be high given the growth expectations for the Bradford community, both residential and commercial/industrial.
Artesian Industrial Parkway	Bradford West Gwillimbury	No	--	A new road serving the developing industrial community of Bradford. Its close proximity to the CN Rail Line makes an interchange here awkward. In addition, proximity to Simcoe County Road 4 interchange via 8th and 9th Line makes an interchange at this location redundant.
Bathurst Street (York Road 38)	York Region	Yes	Full Diamond 	Bathurst Street is the boundary road between King Township and East Gwillimbury and a major arterial road linking points west of the Holland River to Queensville and Keswick, etc. York Region's long term plan for Bathurst Street is a high capacity arterial road through the Region. An interchange here would be an integral component of the network.
Yonge Street	King Township	No	--	Yonge Street operates as a local street north of Holland Landing as it is discontinuous at Queensville Sideroad and terminates about 2000m north of Queensville Sideroad. Demand here would be minimal with significant effects to the residential community and the golf course. Demand would be adequately served by Bathurst and Leslie Streets.
2nd Concession Road	East Gwillimbury	No	--	A low volume rural collector road used mostly for local residential and agricultural use through the study area. Benefit of an interchange here would be low based on travel demand analysis. Access to this area would be adequately provided by interchanges at Bathurst and Leslie. The need to protect for an interchange at this location may be revisited if large-scale development plans for the Queensville area are approved.
Leslie Street (York Road 12)	York Region	Yes	Partial Diamond 	A high volume rural arterial road serving provincial, regional and local traffic. The future long term plan is for Leslie Street to remain as a high volume arterial road. An interchange here would provide good spacing from Bathurst Street servicing the Queensville community although only access from the west can be accommodated due to weaving conflict with 404 interchange. Adjacent 404 interchanges will accommodate demand from the east.

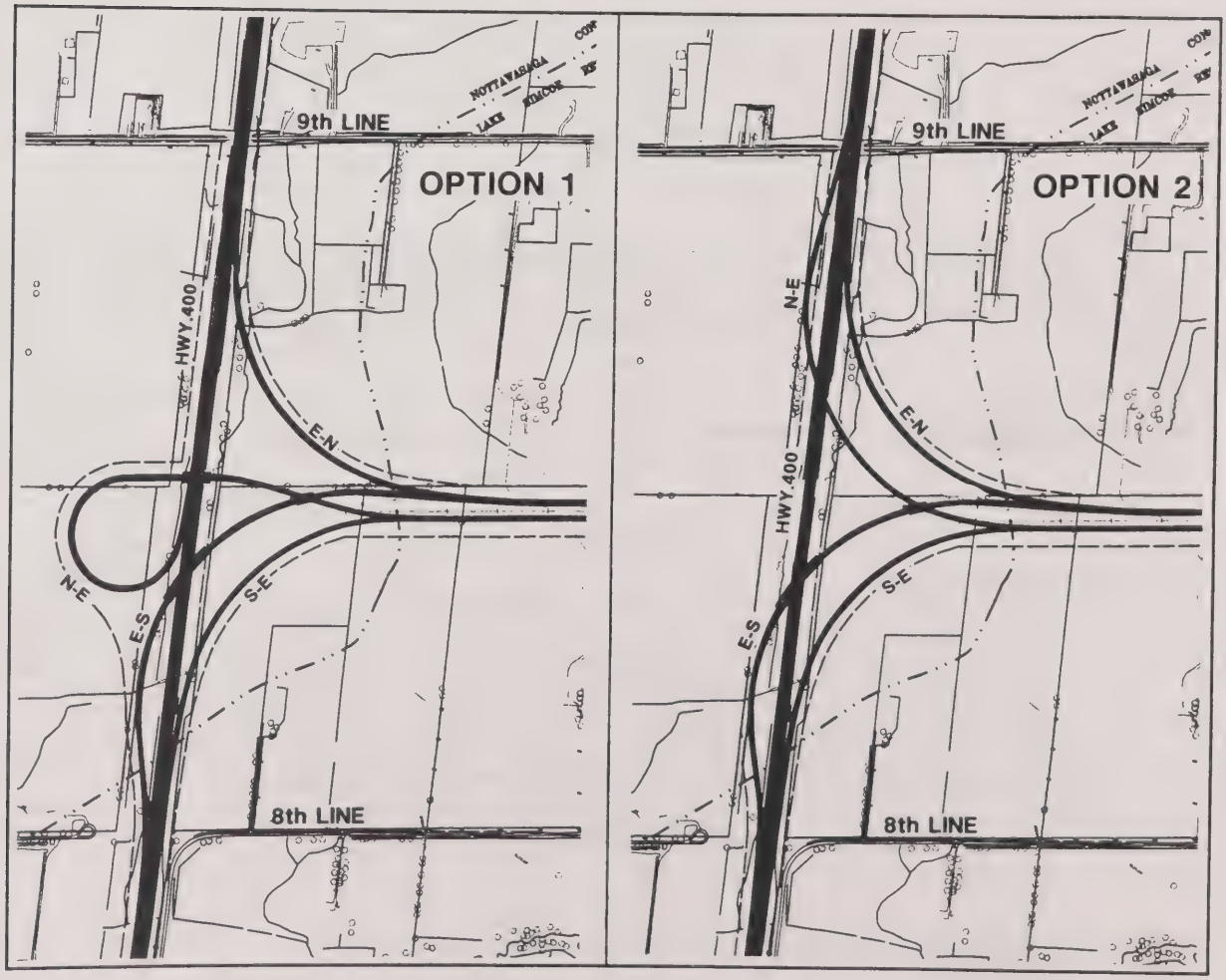
Refinement Considerations

1. Highway 400 Interchange - North to East (N-E) Ramp

Two alternative designs were considered for the N-E ramp, in an effort to maximize cost effectiveness and level of service and minimize property requirements:

- Option 1 - a 2-lane inner loop
- Option 2 - a 2-lane direct ramp

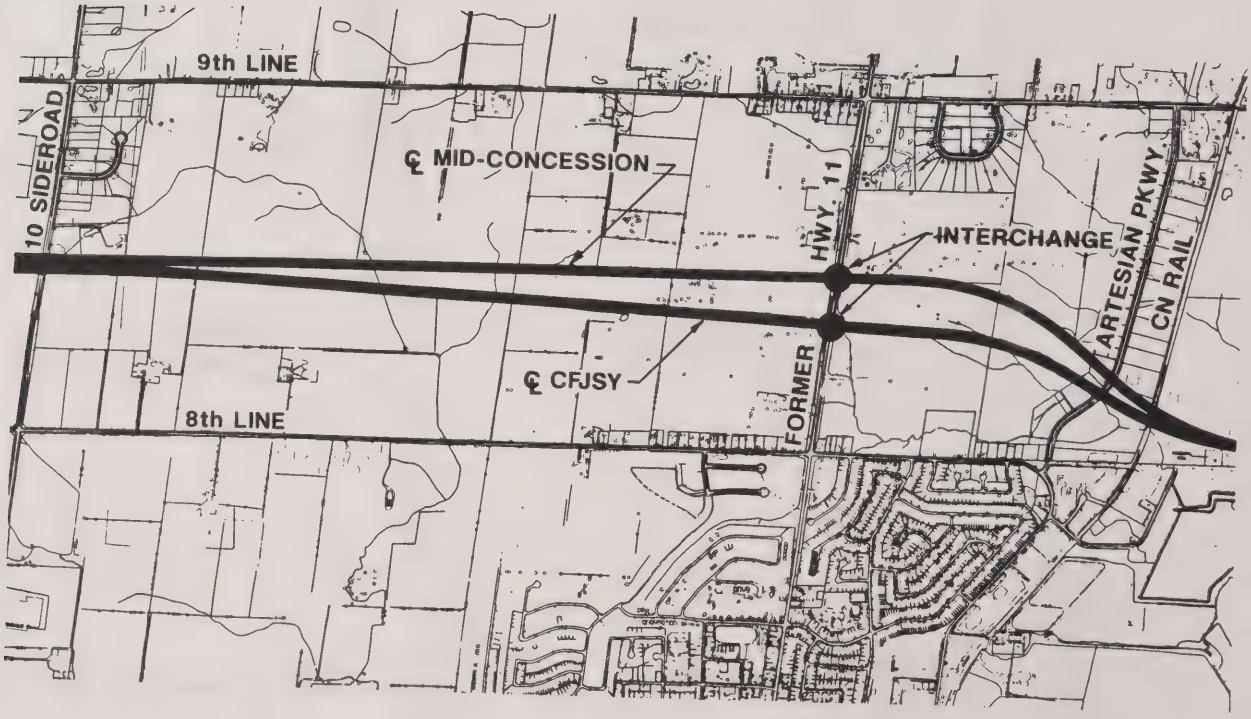
Based on the comparison, Option 1 was recommended for the preferred route primarily because it would be more practical and less expensive in terms of protecting for the opportunity to construct an initial stage of the Link as a 2-lane highway. The inner loop option could also be used to facilitate the E-S move for the 2-lane highway. These benefits would be offset by greater property requirements and loss of agricultural land.



2. Horizontal Alignment Alternatives at Simcoe County Road 4 (former Highway 11)

In an effort to minimize effects for residential and agricultural land uses, a refinement of the CFJ route from 10th Sideroad to the Holland River west branch was considered which would generally route the alignment along the mid concession property line. This alignment would tend to minimize property severances to agricultural land uses between 8th and 9th Lines. However, while this configuration would minimize effects, more property would be impacted overall.

The steep topography and resultant grade differences at County Road 4 would require significantly longer interchange ramps and therefore more property to implement the ramps. Therefore, the original route was determined to be most preferred because it would have the least overall property effects and lower cost. Both alignments would have minimal impacts on the existing profile of County Road 4.



3.a) Horizontal Alignment Alternatives at Bathurst Street

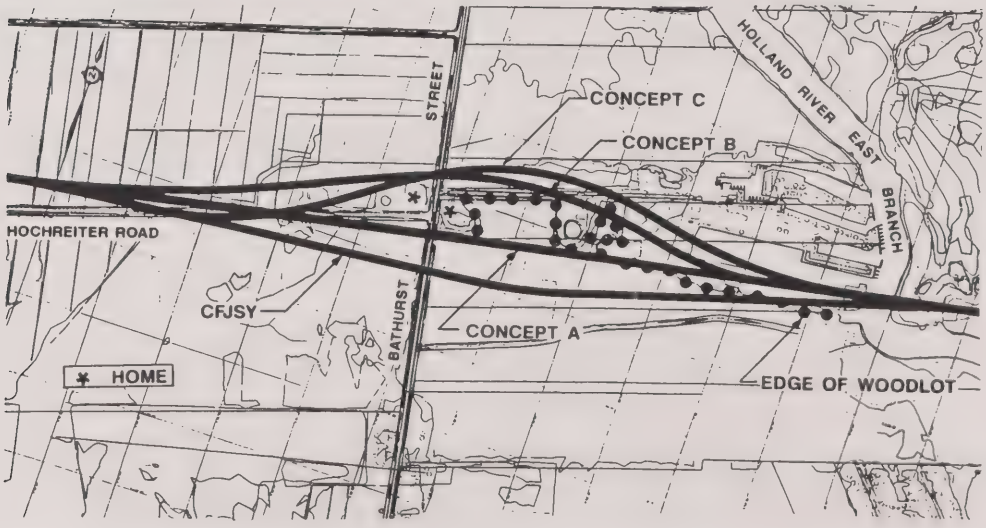
Three alternative horizontal alignment concepts between Sta. 18+000 (Holland River West Branch) and Sta. 21+700 (Yonge Street) were reviewed subsequent to concerns raised by the MNR regarding the potential impacts to a significant woodlot that is situated within a wetland area impacted by the CFJSY alignment west of the Holland River (east branch) and just south of Albert's Marina. The alternatives were developed in an attempt to minimize potential impacts to the woodlot area while not compromising potential effects for the other evaluation criteria.

A field review and more detailed analysis of possible alternatives to the CFJSY alignment did support the MNR position, in that a shift to the north was found to be reasonable and desirable. The impact on the woodlot, for example, would be reduced by 40% for Concept A, 50% for Concept B, and more than 60% for C. Significant concerns arose, however with Concepts B and C:

- either concept would result in locating interchange ramps on a low-radius curve; this is highly undesirable from a safety point of view and consequently avoided by the MTO wherever possible;
- either route would have a major impact on the Albert's Marina site, after the route selection process having gone to great lengths to minimize such impacts;
- the westbound Link exit ramp would, in either of Concepts B or C, impinge on the wetland abutting the north edge of the Marina property, thereby negating the benefits of avoiding the other wetland in the southwest quadrant of the interchange;
- reinstatement of the Albert's Marina access off Bathurst Street would require a new driveway placed in the wetland area to the north of the interchange.

Given that Concept A would resolve or avoid most of the above points while still representing a considerable improvement over CFJSY, Concept A was selected as the preferred alignment between Sta. 18+000 and Sta. 21+700. While MNR's preference remained Concept C or B, the MTO could not, considering all of the impacts, support an alignment farther north than Concept A.

Note: This recommendation supersedes the recommendation rationale for the vertical alignment options considered in 3b) which was to maintain access to houses north of CFJSY at Bathurst Street.

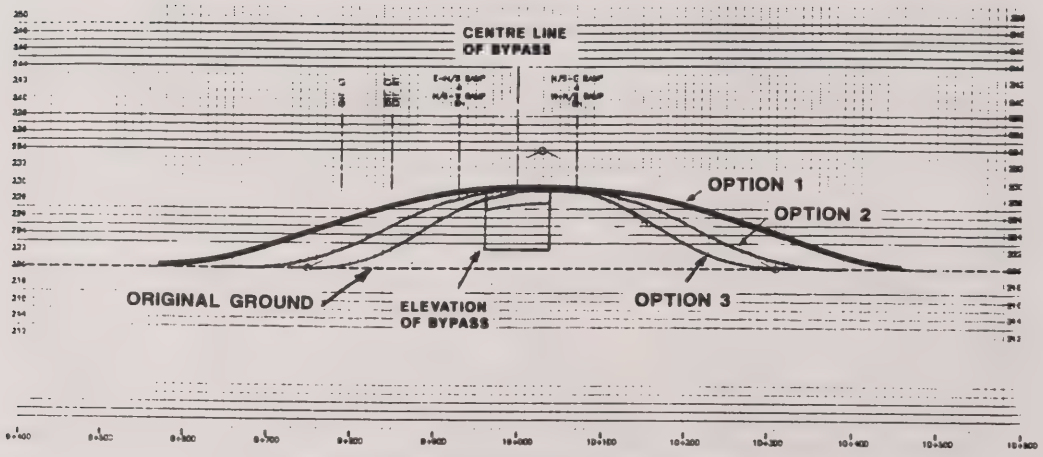


3.b) Vertical Alignment Alternatives at Bathurst Street

Three vertical alignment options were considered for Bathurst Street passing over the Link (CFJSY alignment). The intent was to minimize residential property effects while maintaining an adequate design speed for the road which functions as part of the Regional Road network in York Region.

Vertical alignments with design speeds of 60, 80 and 100 km/h were considered. Option 2 was determined to be the best and replaced the original crossing at Bathurst Street because it would provide an adequate design speed for the road's function in the Regional Road network and would not remove any homes.

Note: The rationale for this recommendation was superseded by the recommendation outlined in #3a as the CFJSY alignment was replaced with Concept A which would remove the two houses on Bathurst Street at Hochreiter Road. However, Option 2 is still preferred because it would be the least expensive and would minimize the shift of two entrances north of the interchange which is required to provide for adequate intersection spacing from the ramp terminals.



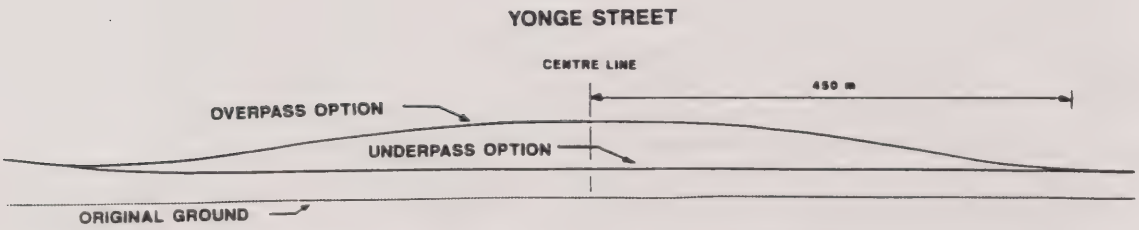
BATHURST STREET PROFILE

4. Vertical Alignment Alternatives at Yonge Street

There are several homes on Yonge Street which would be affected by the crossing of the Link at Yonge Street. The initial assumption was an underpass with a 2-lane Yonge Street over the Link, however, two additional options for the crossing were considered to determine if impacts to these residential properties could be reduced.

- Underpass Option, with Yonge Street over the Link with one 2-lane structure
- Overpass Option, with the Link over Yonge Street with twin 2-lane structures
- Cul de Sac Option, with Yonge Street closed at the Link

The overpass option was determined to be better than the underpass option because conditions on Yonge Street would remain as existing and it would not require the buy-out of any properties. The underpass option would require the buy-out of at least 1 property because of the required grading of Yonge Street over the Link. The overpass option was also determined to be better than the Cul de Sac option. The cost, travel time and environmental impact of extending Holborn Road west to provide an alternate access to properties north of the Link, thereby allowing Yonge Street to be closed at the Link, was found to be greater than the options which maintained Yonge Street's continuity. Therefore, the overpass option at Yonge Street replaced the underpass option as part of the preferred route.

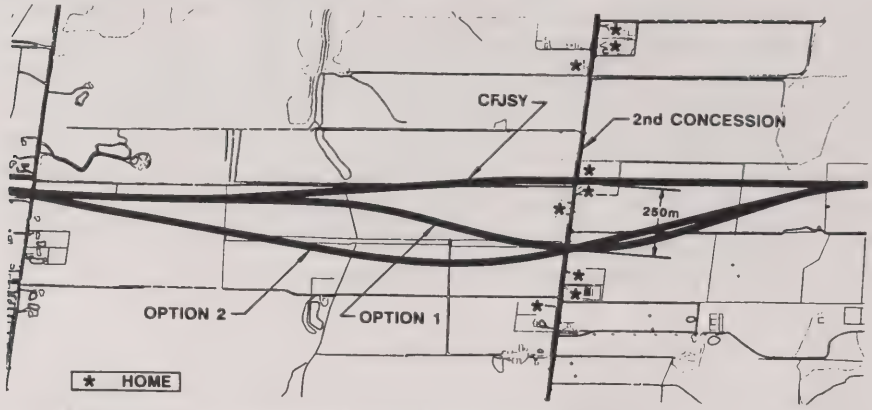


BYPASS PROFILE AT YONGE STREET

5.a) Horizontal Alternatives at 2nd Concession Road

Two additional horizontal alignments were considered for the section of Link between Sta. 22+000 (200 m east of Yonge Street) to Sta. 25+000 (midblock between 2nd Concession and Leslie) in an effort to minimize property impacts along 2nd Concession.

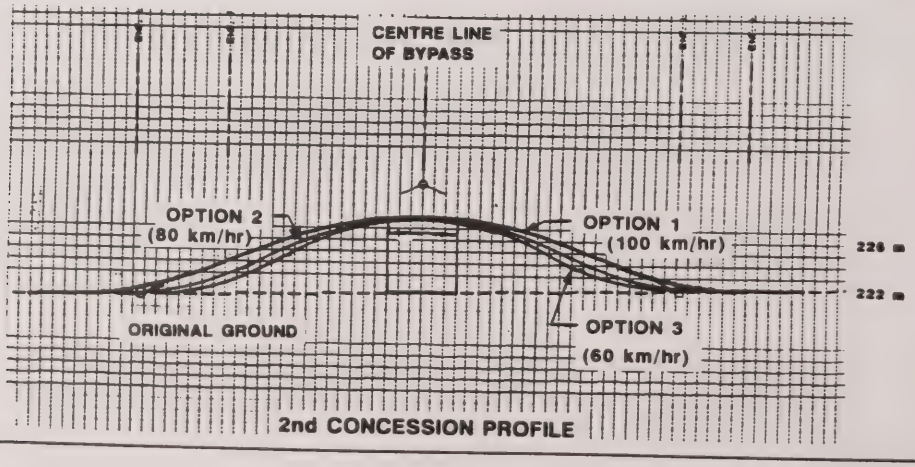
The original alignment generally follows existing property lines and therefore would minimize effects to agricultural properties. The two additional options considered would result in less desirable agricultural severances and affect more residential properties overall because of grading requirements for 2nd Concession Road. Therefore, the original CFJSYB alternative remained as part of the preferred route. (This was subsequently superseded as a result of an alignment shift at Leslie Street. See #6.)



5.b) Vertical Alignment Alternatives at 2nd Concession Road

The vertical alignment of 2nd Concession Road over the Link was analysed similar to the Bathurst Street crossing to determine if residential impacts could be minimized.

Similar to Bathurst Street, three options - design speeds of 60, 80 and 100 km/h were considered. The 60 km/h design speed option was not considered reasonable because, while it would maintain access to all homes adjacent to the Link, there would be concerns for driver safety and pedestrians because of short stopping sight distances. The 100 km/h design speed option and the 80 km/h design speed option would have similar effects on the adjacent residential properties therefore the 100 km/h design speed option was recommended because it would provide the highest level of service and a safer crossing at a marginal increase in cost.



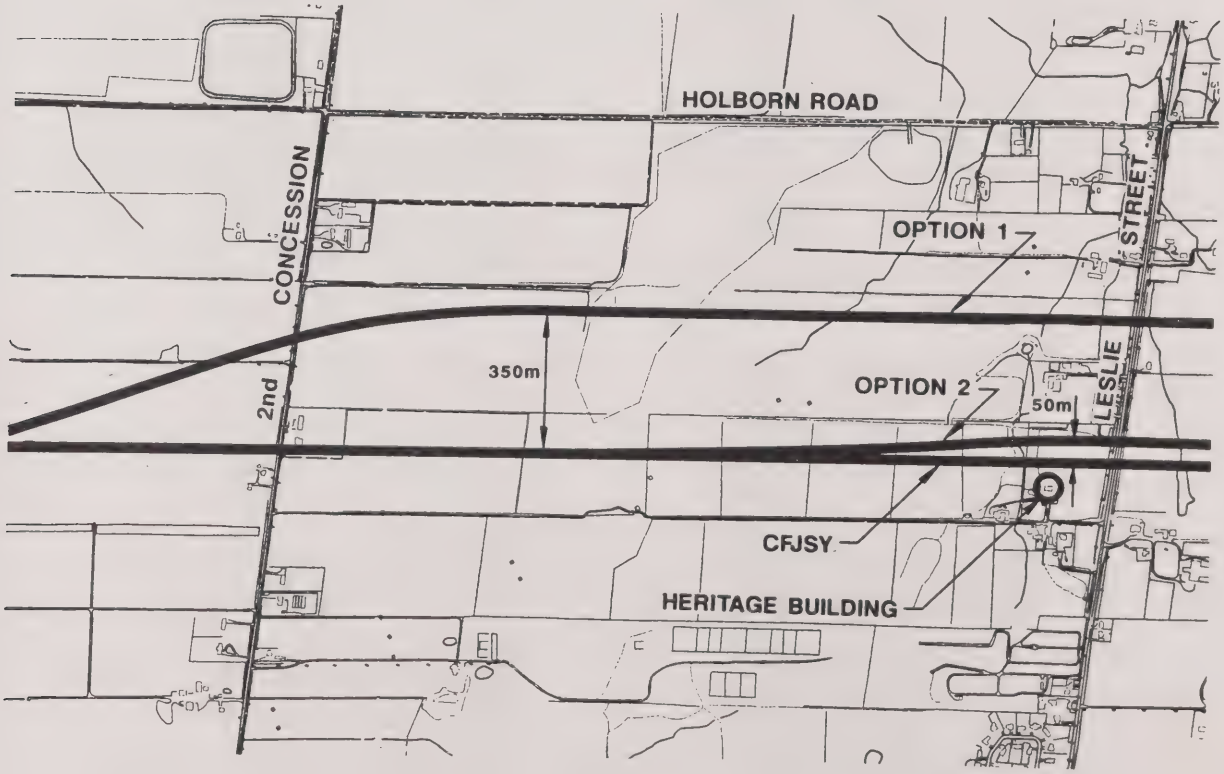
6. Horizontal Alignment Alternatives at Leslie Street

Additional heritage information gathered subsequent to the analysis and evaluation required that options be investigated which would remove direct impacts to a heritage structure (farm house) on Leslie Street caused by the CFJSYB alignment.

Two options were reviewed: Option 1 approximately 350 m to the north of CFJSYB (see sketch) and Option 2 a shift of the alignment approximately 50 m north of the CFJSYB Leslie Street crossing.

Both Option 1 and 2 would remove direct impacts to the heritage structure however Option 1 was preferred because the shift in the alignment, which starts west of 2nd Concession Road, would remove impacts to all residential properties on 2nd Concession Road and Leslie Street. Option 2 would still impact 4 residential properties on 2nd Concession Road.

Therefore, Option 1 replaced the original CFJSYB alignment from west of 2nd Concession Road to proposed Highway 404 Extension. (This refinement supersedes the horizontal alignment considerations discussed in #5a.)

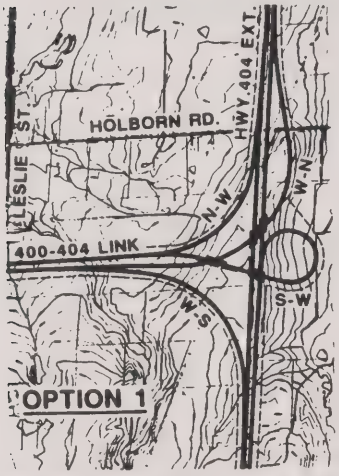


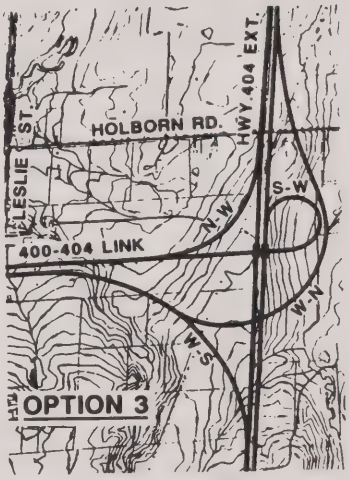
7. Highway 404 Interchange - All Ramps

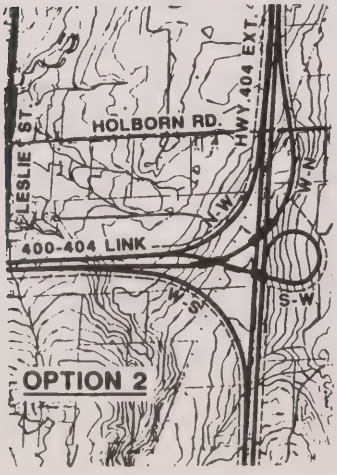
Four alternative designs were considered for the connection of future Highway 404 Extension with the Link. The configurations of each are shown below and were assessed for cost effectiveness and overall level of service.

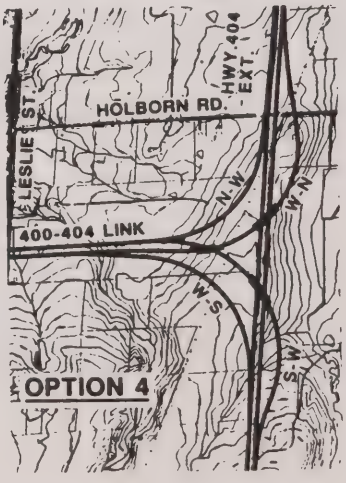
Similar to the interchange connection at Highway 400 it was determined that an inner loop ramp for the S-W move would be preferred from a staging perspective. This would apply to Options 1, 2 and 3. Option 2 was determined to be preferred because it would be substantially less expensive than Option 1 (because of grading requirements) with similar level of service. It would also be less expensive than Option 3 and would impact 5 ha less agricultural land than Option 3.

Therefore the Option 2 connection of the Link to future Highway 404 Extension was included as part of the preferred route.









4.2.3.10 Technically Preferred Route

Based on the preceding, the conceptual design of the Technically Preferred Route was carried out. The conceptual design of the Technically Preferred Route is shown on Exhibit 5-1 in Section 5 at a scale of 1:50,000 and includes proposed interchange configurations and right-of-way requirements.

4.2.4 Summary of Comments from External Agencies, Municipalities and the Public

4.2.4.1 External Agencies

External Team meetings were held prior to each PCS. Separate meetings were also scheduled with Ministry of Natural Resources (MNR), Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), and the Lake Simcoe Region Conservation Authority (LSRCA).

Issues of concern from External Agencies were typically discussed at meetings although written correspondence was also used. Key correspondence and minutes are included in Appendix E. The significant External Agency comments were as follows:

Ministry of Natural Resources (MNR): In a letter dated August 12, 1993, MNR staff indicated their position against crossing or otherwise impacting on Class 1 Wetlands (Holland Marsh). In particular, severing a large block of contiguous wetlands is unacceptable. MNR staff suggested three acceptable options in the Holborn Road - Queensville Sideroad area.

Following the identification of these issues/concerns, meetings were held with MNR and the LSRCA to agree on a minimum impact design criteria to be used when developing viable routes. The discussion below documents these results of those meetings in determining an acceptable alignment across components of the Holland Marsh.

At a meeting on October 14, 1993, MNR staff sought assurance that existing Queensville Sideroad would be assessed on an equal basis with the "new route" alternatives.

In a letter dated October 28, 1993, with regard to the study area boundaries and effects to the Holland River, MNR staff noted that the two crossings of the Holland River on the west side of the study could not be done without significant loss of wetland values regardless of the construction techniques applied.

At a meeting on December 16, 1993 the MNR reiterated their concerns about the potential impact, especially fragmentation, to the wetlands of any roadway, including that of an elevated roadway. The MNR agreed that the study area for reasonable roadway alternatives as outlined in the October 28, 1993 letter, would be revised to allow consideration of alternatives in the Eighth Line - Hochreiter Road corridor. The MTO indicated that there would be continuing reviews with the MNR as route alternatives are developed.

At a meeting on January 10, 1995 the MNR indicated their preference of the K and L crossings of the Holland River, however, accepted the rationale for the Project Team's preference of the J

crossing. The MNR noted that the river crossings were largely in areas of previous disturbances and were justifiable in terms of the MNR Wetland Policy Statement.

At a meeting on February 20, 1996 the MNR noted the following:

- preferred route appears to be logical and reasonable
- the crossing of the main branch of the Holland River appears to be consistent with previous MTO commitments to crossing wetlands only in areas of previous disturbance and on structure

At a meeting on October 25, 1996, the MNR noted that based on new information they had the following concerns:

- investigation of alternative alignments between the two branches of the Holland River is desirable, with the intent being to shift the new route as far to the north as possible between those two constraint areas
- similarly, it would be desirable from MNR's perspective to shift the alignment northerly at Yonge Street, to run more along the southern portion of the disturbed (Golf Course) lands than the woodlot
- an outline of, and commitment to, investigation of impacts at the crossing of the glacial Lake Algonquin shoreline west of Leslie Street is desired

In a letter dated December 3, 1996, the MNR indicated their preference of the 2 northerly route refinement considerations as they would:

- follow to the greatest extent possible, the areas of previous disturbance;
- position the alignments north on the west side of Bathurst Street which ensures that the wetland area south of the existing Trussler Road right-of-way will be least disturbed;
- present the least disturbance to forest and wetland habitat;
- span water course crossings that will minimize disturbance to the river channel and productive wetland margins.

Further investigation of alternative alignments resulted in a refinement to the alignment which shifted it northerly to reduce impacts to the woodlot to the south. Refer to Section 4.2.3.7 (3a).

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA): A letter from OMAFRA dated October 19, 1993 stated that the evaluation criteria ... "should contain a specific listing for specialty crops, particularly the Holland Marsh soils". This should be valued in terms of loss of specialty crop soil in the same way that the study proposes to evaluate the loss of Class 1 soil.

At a meeting on November 4, 1993 OMAFRA staff indicated that they supported the EAP as written, and would take a "least impact" approach for the taking of agricultural land.

Following the October meeting and subsequent November letter, OMAFRA staff indicated their acceptance of the study area, the study process for determining the preferred route, and ultimately the preferred route as it would largely avoid marsh farming and respects back lot lines. This is documented below.

At a meeting on December 16, 1993 OMAFRA staff indicated that the defined study area was acceptable. It was also stated it would be preferred, if additional property was acquired for reverting lands to a wetland function, that agricultural lands would not be taken.

A letter from OMAFRA dated October 18, 1994 stated: "The process should attempt to locate corridors outside Agricultural designations or reduce agricultural impact of corridors located partially in agricultural designation. Those impacts will include loss of the physical resource, loss of farm investment, fragmentation and resulting changes in farming patterns due to access."

At a meeting on February 20, 1996 OMAFRA staff indicated that since the preferred route largely avoids marsh farming and respects the back lot lines, there should be few problems from an agricultural perspective provided mitigation is in place.

Ministry of Municipal Affairs and Housing (MMAH): At a meeting on February 20, 1996 MMAH staff asked the following questions (Project Team response in italics):

1. Do both this study and the Highway 404 EA study use the same evaluation criteria and factor weights? *The evaluation criteria was identical as defined in the Environmental Assessment Proposal for each project; the weights differ somewhat to reflect different concerns/issues affecting the two study areas.*

2. Why were other corridors considered? *The EA Act requires that alternatives be considered and to reflect public input.*

3. Why rule out the Highway 9/Green Lane Corridor? *The Bradford corridor was preferred for a freeway in terms of highway network expansion, ease of construction, relationship to municipal land use planning and avoidance of residential areas; Highway 9 - Green Lane was studied closely but it was determined that, although upgrading is needed for local access and traffic relief it cannot accommodate local and long distance travel demand in the long term. The Corridor Comparison Study (December 1995) can be referred to on this topic.*

4. What are the major origins and destinations served by the proposed new road? *Traffic modeling indicates commuter travel demand being primarily from Barrie and other origins north on Highways 400 and 11 crossing over to the 404 corridor, for distribution to employment areas in Newmarket, Aurora, Richmond Hill and Markham, and conversely from the south shore of Lake Simcoe (Keswick, Pefferlaw, etc.) and beyond crossing to Highway 400 and moving south as far as Metro Toronto. Local motorists such as those in Bradford*

and Holland Landing would also use the facility. Although not modelled with detail due to lack of reliable data, recreational trips would also be attracted to the route as being the only continuous high-standard roadway linking the two north-south freeways north of Highway 407.

5. What is timing of property acquisition? *Upon approval of the EA, the right-of-way would be designated for future roadway needs, but actual acquisition of the necessary property would not normally occur until two or three years prior to construction. There is currently no schedule for construction.*

6. What are the municipal perspectives on the proposal? *York - supportive, per the Official Plan; Simcoe - no position; defer to local municipality; Bradford West Gwillimbury - both interested and concerned, with general support (can be reflected in imminent O.P. update); King - no position, only small portion of township crossed; East Gwillimbury - accepting of principle but concerned about social impacts.*

Lake Simcoe Region Conservation Authority (LSRCA): A letter dated November 10, 1994 indicated that "the southeast portion of Scanlon Creek is within the study area." Also, impacts will go beyond the study area and thus the study should also review these potential impacts.

At a meeting on February 20, 1996 the following issues/concerns were indicated:

- main concern is flood control; they will be looking for calculations/modelling to demonstrate no adverse effect on floodplains (analysis will be undertaken during the preliminary design stage and reviewed with the Authority)

- the Holland River floodplain in the vicinity of the Holland Marsh is quite broad, therefore, floodproofing (e.g. minimum sill elevations) is given consideration in reviewing permit applications rather than prohibiting all development in the area. Creation of new lots entirely within the floodplain is not permitted. Other considerations include access, flooding depth and flow velocity.

At a meeting on November 1, 1996 LSRCA staff noted that for EA purposes, it was appropriate to work on the basis of zero increase in upstream flood levels, or at least zero increase in the associated impacts (i.e. expansion of the flooded area to affect additional homes than would otherwise be impacted by a regional flood). A hydrologic study would need to be prepared at the detail design stage in order to avoid either over- or under-sizing the structures. The basic principle committed to in the EA would be that "all road crossings are to be capable of passing the peak flow generated by a regional storm without impacting upstream development." In addition, with regard to stormwater runoff, it would be more appropriate to commit to the "best practices of the day" rather than current standards because it is such a long term project.

Based on the above concerns and the typical approach for identifying mitigation measures and further commitments the MTO responded by carrying out a preliminary assessment of potential increases in flood elevations at the proposed Holland River crossings. Results of the assessment indicated flood elevation increases of 0-0.16 m. The Ministry has also outlined their commitment

to future work regarding flood risks and stormwater management in Section 5.2.5 and 5.4.6, respectively. The results of the assessment are included in Appendix F.

York Region Public Health Department: On a comment sheet received following the June 1994 PCS, "Water quality/quantity must be a major consideration to the residents of York Region." The identified impacts included: availability/quality of groundwater, existing wells at risk from road runoff; and runoff affecting groundwater supplies and recreational waters.

Development of the preferred route considered the location of the Bradford municipal well and as a result it is not impacted by the preferred route (see Section 5.4.2.6).

Ministry of Citizenship, Culture and Recreation (MCzCR): In a letter dated April 23, 1996, the MCzCR indicated that "A principal concern of this office is the adverse effects that undertakings such as the above mentioned may have on cultural heritage resources. If a preferred alternative is determined to have the potential to have an impact on cultural heritage resources, then this office would recommend that a cultural heritage resource assessment be prepared as part of the Environmental Assessment. If any significant cultural heritage features are identified, then any negative impacts would have to be mitigated by either avoidance or documentation."

A cultural heritage assessment was carried out to determine the extent of potential impacts of the preferred routes. The results of the assessment is summarized in Section 5.4.5 and reproduced in full in Appendix I.

Canadian Coast Guard: A letter dated April 7, 1995 advised that "the proposed vertical clearance of 22.5′ above water level 718.83 GSC is still considered acceptable" for the proposed Holland River crossing. The horizontal clearance should be increased to a minimum of 65′ from our earlier recommendations.

The development of a road profile for the preferred route has accommodated the above minimum clearances.

Generally, it was possible to incorporate most of the concerns put forth by External Agencies during the route planning stage. Other concerns and requirements are addressed in Section 5 which describes mitigation measures and commitments to future work. On the whole there were not any issues that were not or could not be resolved in an equitable manner.

4.2.4.2 Municipalities

During the study, contact with staff of the five affected municipalities (County of Simcoe, Region of York, Town of Bradford West Gwillimbury, Town of East Gwillimbury, King Township) was maintained through individual meetings and presentations. Issues of concern were for the most part discussed at these meetings however written correspondence was also used to discuss concerns. There were not any significant issues raised by affected municipalities that could not be addressed during the route planning stage of the study.

4.2.4.3 General Public

As noted in Section 2.2.2, Public Consultation Sessions (PCS) were held at key points during the study to provide members of the community an opportunity to comment on the study findings made by the Project Team. PCS summary reports have been prepared and are included in Appendix C. Newspaper articles and notices pertaining to the study are included in Appendix E.

Public involvement in the route planning stage of the study (study findings presented at the second and third sets of PCSs and additional public meeting to discuss Highway 9/Green Lane vs. Bradford corridors) identified many issues and concerns with route generation and ultimately the preferred route. Table 4-2 is a summary of the public's comments and concerns with the study findings during the route planning stage as determined by the Project Team.

Table 4-2: Summary of Comments/Concerns Raised by the Public

Category	Summary of Comments
Need for the Link	• General support for the Link however about a 50/50 split whether the Link should be in Bradford or in Highway 9-Green Lane/Highway 89-Ravenshoe Road • Some are opposed to the Link or don't see the need for it
Route Alternatives	• many stated preferences among the alternatives presented • additional routes brought forward by members of the public were: - through Scanlon Creek Conservation Area - north of Silver Lakes Golf Course • organic soils are very deep in the vicinity of some of the alternative Holland River crossings • additional wetland areas (unclassified) will be encountered along some mid-concession alignment alternatives • a designated environmental area exists between 8th and 9th Lines east of Highway 11 (existence and nature of this area is to be determined) • Holland River crossing alternative "L" (near the existing Highway 11 crossing) is not reasonable (geometrically) • direct access to east side of Bradford should be provided
Concerns Expressed about Impacts of Route Alternatives and the Preferred Route	• farm operations/loss of good farm land • property values and compensation (many comments/questions) • privately owned "historic" homes/farms; lands not yet surveyed • wetlands/wildlife (loss of habitat) • Scanlon Creek Conservation Area • noise • aesthetics • ground water quality (wells) • air quality (local) • poor soil conditions • loss of privacy/effects on lifestyle • effects to economy (businesses downtown; golf course; marina) • flood risk

Category	Summary of Comments
	• tunnelling of Holland River • boat clearance at Holland River structures • traffic and access • design considerations
Miscellaneous Comments	• cost of project • encouraging employment in the area would reduce the number of commuters thereby eliminating the need for the project • many concerns about property acquisition including compensation and timing • many questions about timing of construction

The public's concerns with regard to need and the location of the Link (Highway 9-Green Lane or Bradford) have been addressed and documented in Section 3 Transportation Needs Assessment. Many of the public's concerns have been addressed, in part, in Section 5 which identifies the net effects of the preferred route and the mitigation measures and commitments to further work. Other concerns such as timing of the project, property compensation and noise mitigation will be addressed in future stages of the project and are also discussed in Section 5.

4.2.4.4 Interest Groups

Several groups were in contact with the Project Team, however, they were not necessarily active throughout the course of the study.

Interest groups were generally contacted through correspondence, attendance at PCSs, and individual meetings. Individual meetings were held by three interest groups in which to provide a forum for discussion of issues relating to the MTO's proposals. The MTO was invited to these meetings, making a presentation and answering questions from attendees.

These groups were HEART (Heritage, Environment, Agriculture, Recreation, Tourism), FROGS (Forbid Roads Over Green Spaces) and the Bradford Chamber of Commerce.

HEART is a group whose focus is the increased and continued vitality of the Bradford community. HEART is generally supportive of the preferred route and its potential benefits to the community especially the positive effects to area businesses. However they also have concerns with regard to negative economic impacts, impacts to agricultural lands, noise impacts, property effects, and effects to groundwater, for example.

FROGS was very active in the study and for the most part oppose a Highway 400-404 Link especially in the Bradford corridor. FROGS' position is that the future demand on the transportation network would be better accommodated by the Highway 9/Green Lane corridor. The rationale for setting aside this corridor is documented in Section 3 Transportation Needs Assessment.

Generally FROGS concerns relating to the route planning stage of the study focused on:

- the preservation of the natural environment

- noise levels
- pollution and wetlands
- flood risk
- cost
- need and justification

4.2.4.5 Summary of Actions Taken to Address Issues/Concerns

Table 4-3 highlights the major concerns/issues which arose during the study and indicates how they were addressed by the Project Team.

Table 4-3: Action Taken to Address Issues/Concerns

Issue/Concern	Action Taken	Section Reference
• Consider Highway 89 - Ravenshoe Road Corridor	• Ministry's position confirmed with respect to not considering alternatives within the previously studied area	3.1.2
• Consider Highway 9 - Greenlane Corridor	• detailed travel demand analysis and corridor assessment carried out to confirm need	3.1.2.2; 3.5
• Relative weightings of natural and man-made environment	• All aspects of the environment considered; public input to weighting of factors encouraged	4.2.3 Exhibit 4-5 Exhibit 4-6
• Crossing of Holland Marsh by a new highway	• Meetings with Ministry of Natural Resources and Lake Simcoe Region Conservation Authority to agree on minimum impact design criteria to be used in developing viable routes	4.2.4.1 Appendix G
• Solution thought to be preconceived	• Open public involvement process; no "hidden agenda"	2.2.2
• Length of time taken implement plan	• Staging opportunities identified	5.2.3
• Impact of property development freeze in study area	• Freeze zone following an MTO review of development applications reduced as development of alternatives proceeded	--
• Compensation for property impact	• MTO policy re: property impact/compensation to be applied	5.2.7
• New routes vs. existing roads	• Travel demand analysis and planning review demonstrated a requirement for a freeway-type roadway on a new alignment	3.1.2.2
• Eastern/western terminus treatments	• Preliminary design will not preclude extension of roadway beyond 400 and 404	4.2.3.9
• Consider additional route alternatives at CN and at Yonge Street	• New alternatives identified and included in the analysis and evaluation and refinements to the preferred route	4.2.3.5

Table 4-3 Cont'd.

Issue/Concern	Action Taken	Section Reference
• "Indirect" routes are not reasonable	• Pros and cons of each route assessed in evaluation process	4.2.3
• Construction feasibility and cost will be a problem in areas of poor soil conditions	• Impacts, mitigation measures and commitments to further work identified	5.4.2.8
• Property-specific impacts on farm operations, heritage buildings, noise, air quality, visibility, vegetation, water quality, etc.	• Evaluation of alternatives includes criteria representing all impacts; preferred alternative selected on the basis of least net negative impact. Mitigation measures to minimize (where reasonable and possible) impact on properties.	4.2.3; 5.2.7; 5.4.3; 5.4.4 Appendix G
• Lack of public awareness	• Three follow-up public meetings held; brochure #4 (questions and answers) distributed; mailing list expanded; newspaper advertising expanded and lead time increased; community groups became involved in the study	2.2.2.1; 4.2.4 Appendix C
• Impact of Link on businesses in Bradford	• Meeting held with Chamber of Commerce; public workshop held by HEART; detailed economic impact analysis initiated for input to route selection and preliminary design; ongoing consultation with municipal staff, business community and public; "case study" examples of similar situations researched	2.2.2.1; 4.1; 4.2.4.4 Appendix I
• Impact of new roadway on Bradford community growth and character	• Initiated economic impact analysis; criteria included in evaluation of route alternatives	4.1; 4.2.3 Appendix I
• Effect of new roadway on Bradford municipal well	• Meeting held with PUC; well location surveyed; preliminary investigation indicated no impact	5.2.8; 5.4.2.6
• Noise impacts	• Carried out a detailed noise impact assessment to determine potential effect and future commitments	5.4.3.2 Appendix H
• Process does not allow open discussion	• Meetings and workshops held with public and interest groups to discuss issues in an open forum	2.2.2; 4.2.4 Appendix C
• Direct impact to Albert's Marina and Silver Lakes Golf Course	• Meetings with property owners and alignment shift considered in order to find acceptable solution	4.2.3.7 Appendix E
• Impacts to heritage sites	• Historical and archaeological assessment carried out	5.4.5 Appendix J
• Increased flood risk at Holland River	• Hydraulic assessment carried out	5.4.2 Appendix F

4.3 Presubmission Review

In October 1997, a draft version of this Environmental Assessment Report was circulated to Provincial and Federal Government Agencies for review and comment. The comments that were received were taken into consideration in the preparation of this Final EA Report.

Written comments were received from the following Agencies:

Provincial

- Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
- Ministry of the Environment (MOE)
- Ministry of Natural Resources (MNR)
- Lake Simcoe Region Conservation Authority (LSRCA)
- Ministry of Citizenship, Culture and Recreation (MCzCR)

Federal

- Canadian Transportation Agency (CTA)

Both the comments made by the reviewers and the MTO's responses are summarized in Table 4-4. It may be noted that not all Agencies submitted comments on the draft report.

Table 4-4: Summary of Comments on Draft EA

Comment	Response
Ministry of Natural Resources	
• concerned with the proposed routing over the East Branch of the Holland River and the alignment from that point westward to the proposed interchange at Bathurst Street (Concept A). Proposed routing should follow Concept C (1st choice) or Concept B (2nd choice).	• Section 4.2.3.9 discusses and summarizes a review of possible adjustments/refinements considered as part of the Stage 4 evaluation. The evaluation of route refinements in this area identified a preferred routing which when compared to the other considerations provided the best overall balance of advantages and disadvantages.
Ministry of the Environment (Environmental Planning and Analysis Branch)	
Ecosystems	
• the MTO is encouraged to consider any relevant information related to ongoing or completed watershed/subwatershed plans and other ecosystem based studies.	• ecosystem principles were incorporated throughout the route selection process, as documented in Appendix G. • MTO will further consider relevant information (studies, plans, etc.) during the design stage.
Noise	
• report should indicate noise sensitive locations other than existing homes that were used in the analysis of route alternatives.	• there were no other noise sensitive land uses identified in the evaluation of alternatives.
• Exhibit 5-6 should identify the MOE as a concerned agency with respect to noise issues.	• Exhibit 5-6 updated to included MOE as concerned agency under noise criterion.

Table 4-4 (Cont'd)

Comment	Response
• the proponent should consult with the local, regional, and county municipalities to identify draft approved/final approved unbuilt development plans for residential areas and noise sensitive locations; if there are approved plans in place, the MTO would be responsible for noise mitigation.	• there are/were no such development plans in place within the area considered for new route routes; the MTO and each local municipality co-operated over the duration of the planning study to ensure that no plans were made and no development occurred which could affect route planning.
• Section 5.4.3.2 "Noise" should indicate a commitment by the proponent to prepare a Noise Impact Assessment Report as per the MTO/MOE noise protocol.	• Section 5.4.3.2 indicates that given the "conceptual level of design", the recommended noise mitigation strategy will be determined in subsequent phases of the project. The strategy will adhere to the MTO/ MOE noise protocol in place at that time.
• the Design and Construction Report should be referenced in Section 5.4.3.2 "Noise" and address information relating to construction noise and vibration control measures.	• Section 5.4.3.2 revised.
Construction and Operation	
• the EA document should state that the proponent will ensure that all contractors and subcontractors meet all environmental standards and commitments for both construction and operation/maintenance.	• refer to Section 5.3.4 "Construction Phase".
Waste/Contaminated Material	
• Report should identify the MOE's Barrie District Office as a necessary contact in the event that contaminated material is encountered.	• Section 5.4.4.4 revised.
Water Resources	
• show wells and septic systems on route maps.	• each rural residence was assumed to have both a well and a septic system in the evaluation of alternative routes. Refer to Section 5.4.2.6.
• state principle of protection of groundwater from both quantity and quality impacts.	• commitment in Section 5.4.2.6 clarified with respect to groundwater protection; impact analysis and detailed mitigation plan development to be done at the design stage.
• contact York and Simcoe Health Units for guidance in decommissioning septic systems; any unused wells within the right-of-way must be properly abandoned.	• septic systems will be decommissioned and unused wells abandoned in accordance with the regulations in effect at the design stage, as noted in Section 5.4.2.6.
• consult with municipalities regarding the existence of development plans within 100 m of the right-of-way which will be serviced by individual wells.	• no such development plans exist; see response under Noise above.
• concern is expressed with the proximity of the Bradford municipal well to the preferred route.	• detailed investigation of the well/aquifer conditions and consideration of a variety of structural, construction and drainage alternatives designed to protect the municipal well from adverse impacts will be a key part of the design stage.

Table 4-4 (Cont'd)

Comment	Response
• if staged construction is selected, environmental technical work and stormwater management plans should be implemented on the basis of the full four lane freeway needs.	• comment noted.
• clarify MTO commitment to undertake stormwater management, with reference to the MOE's 1994 Stormwater Management Guideline.	• Section 5.4.6.1 summarizes the MTO's commitment, in which the SWM plan for the 400-404 Link will be developed in accordance with the MTO's standard practices for new roadways and in consultation with interested agencies. Reference to specific SWM guidelines or documents is appropriate at this stage because the design stage may not occur for many years, by which time there will likely be new or updated guidelines to which the MTO will need to adhere.
General	
• with reference to Section 5.5, the formal EA should not be submitted without the technical studies to substantiate the recommendation for the referred route.	• the EA Report contains all of the technical and analytic work needed to substantiate the recommendation for the preferred route. The technical studies referred to in Section 5.5 are those associated with the design phase of the project. These investigations are carried out to assess impacts at the level of detail necessary to determine the most appropriate mitigation measures.
• the report is unclear as to how the MTO is to determine during the design and construction phase what a "significant impact" is and how the impact will be addressed through the Class EA process (ref. Section 5.5).	• as noted in Section 5.5, further consultation with stakeholders is a key feature of the design and construction process; this will provide all interested parties with an opportunity to identify and discuss with MTO any outstanding concerns or issues.
• the report should address the impacts of dust and salt during construction and operation on the surrounding environment.	• MTO is researching alternative de-icing materials on an ongoing basis and is testing alternative application methods. Dust control provisions will be incorporated in construction contracts and enforced during construction.
Ministry of Agriculture, Food and Rural Affairs	
• no concerns with EA Report	• comment noted.
Ministry of Citizenship, Culture and Recreation	
• no comment at this time.	• comment noted.
Canadian Transportation Agency	
• guidance provided as to future screening requirements under the Canadian Environmental Assessment Act.	• CEAA approval to be sought separately, pending project approval under the Ontario EA Act.
Lake Simcoe Region Conservation Authority	
• clarification given regarding the ESA boundaries shown in Exhibit 4-3.	• Exhibit 4-3 revised accordingly.

5.0 DETAILED DESCRIPTION OF UNDERTAKING

5.1 Introduction

This Chapter provides a detailed description of the Undertaking together with an assessment of the effects associated with the undertaking, recommended mitigating measures, and commitments to further work. The Undertaking, referred to as the Recommended Plan is shown on Exhibit 5-1 at a scale of 1:50,000 and in greater detail at 1:10,000 scale on Exhibit 5-2, Plates 1 through 10.

5.2 Major Features of the Undertaking

5.2.1 Concept Design Features

As noted above, the recommended alignment is illustrated in Exhibit 5-2, Plates 1 through 10. The plans have been developed to a concept level of design with the detail such that design and construction alternatives could be essentially contained within the identified right-of-way. If refinements to the identified right-of-way are necessary due to specific future conditions (e.g. implementation of Stormwater Management facilities), these will be handled through discussions with affected property owners and agencies as part of the Class Environmental Assessment process to be initiated by the MTO (see Section 5.3).

5.2.2 Roadway Design

The proposed freeway linking Highway 400 and extended Highway 404 will be a 4-lane controlled access facility for its entire 16.2 km length. The freeway cross section will be rural (shoulders - no curbs) within a basic 100 m right-of-way and have a design speed of 120 km/h. The cross section will incorporate a 30m wide grassed median, with the exception of the two Holland River crossings east of Bradford where the median width will narrow to 8 m with a concrete barrier. Typical cross sections for the Recommended Plan are shown in Exhibit 5-3.

The continuity of all existing crossing roads will be maintained and each will ultimately be grade-separated with the freeway. There will be interchanges at 5 locations along the proposed route:

- Highway 400 (provincial freeway);
- Simcoe County Road 4 (former Highway 11);
- York Regional Road 38 (Bathurst Street);
- York Regional Road 12 (Leslie Street), partial interchange; and
- proposed Highway 404 (provincial freeway)

Other grade-separated crossings include the following:

- 10 Sideroad (Middletown Road) Town of Bradford West Gwillimbury Road
- Artesian Industrial Parkway Town of Bradford West Gwillimbury Road

•	CN Rail	CN North America - Newmarket Subdivision[4]
•	Yonge Street	Town of East Gwillimbury Road
•	2nd Concession Road	Town of East Gwillimbury Road

Interchanges

Highway 400

The proposed interchange shown on Plate 2 will provide all freeway-to-freeway moves between Highway 400 and the Link. With the exception of the N-E move all ramps will be directional and have a design speed of 100 km/h. The N-E ramp will be an inner loop with a design speed of 80 km/h. Due to their length, all ramps will be two lanes wide, narrowing down to 1 lane at the entrance terminals.

The interchange is designed to be able to accommodate a two stage implementation for the Link (refer to Section 5.2.3). As a 2-lane arterial highway in the first stage, ramps would be single lane and the E-S move could be accommodated by sharing the N-E inner loop 2-lane structure across Highway 400, forming a trumpet design interchange.

Simcoe County Road 4 (former Highway 11)

The proposed Parclo A-4 interchange at County Road 4 is shown on Plate 4. The Link will pass under County Road 4 and the ramps will provide all moves between the roadways. All entrance ramps to the Link will be single lane while both exit ramps will be 2-lane with provision for turning lanes at the ramp terminal intersections with County Road 4. Ramp terminal intersections will likely be signal controlled. County Road 4 will require reconstructing to a constant 4% grade through the interchange with the provision for widening to 4 lanes. The proposed County Road 4 structure will be 4 lanes wide to accommodate future widening.

Bathurst Street

Plate 6 shows the proposed Diamond interchange of the Link with Bathurst Street. Bathurst Street will pass over the Link via a 2-lane structure and the ramps will permit all moves between the roadways. The design reflects the surrounding environmental constraints as well as the minimal traffic volume on Bathurst Street to the north of the interchange.

All ramps will be single lane; exit ramps will have the provision to widen to 2 lanes at the ramp terminal intersections with Bathurst Street. Ramp terminal intersections will be controlled by unsignalized intersections.

[4] See Section 5.2.8, Railways

RECOMMENDED ROUTE FOR PROPOSED 400-404 LINK

PROPOSED 404 EXTENSION

FULL INTERCHANGE

PARTIAL INTERCHANGE

RESIDENTIAL AREAS

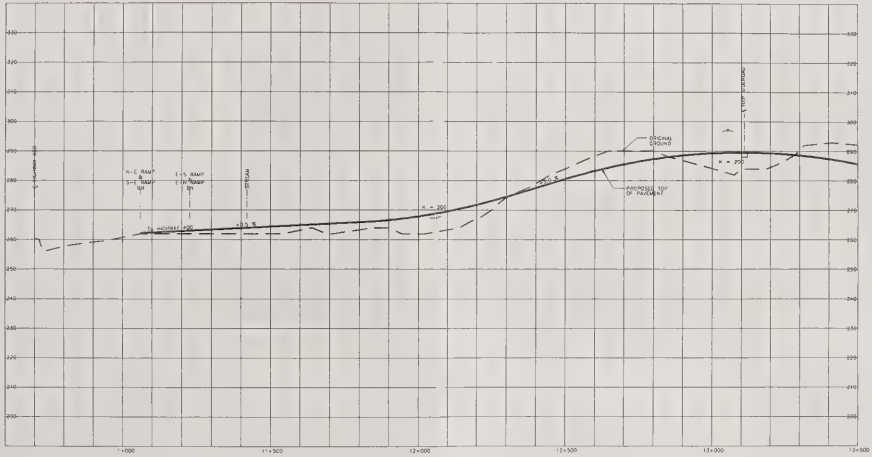
NOTE: HWY. 88 WILL BE BECOME A SIMCOE COUNTY ROAD ON JAN. 1, 1998.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

RECOMMENDED PLAN

EXHIBIT 5-1

SCALE 1:50,000



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

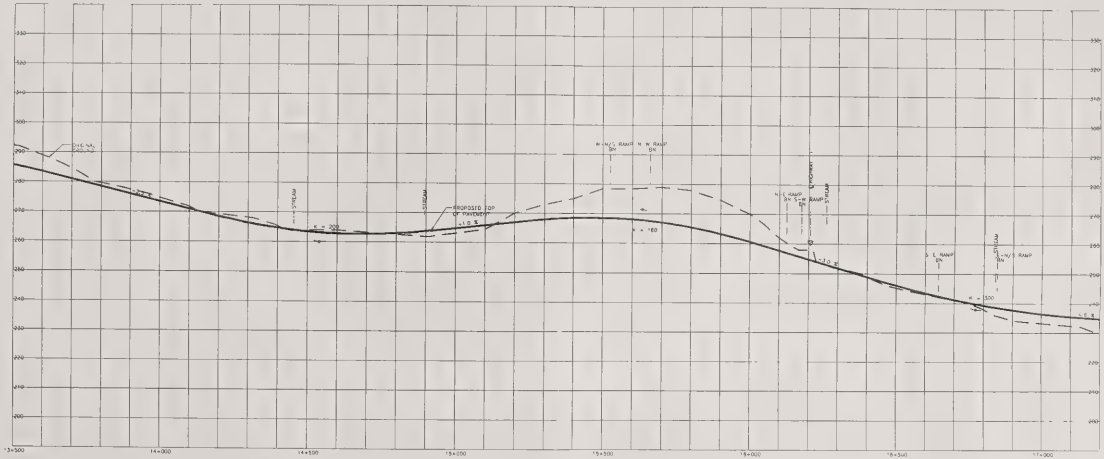
EXHIBIT 5-2

SCALE H = 1:10,000 V = 1:1,000

PLATE 1

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2	
SCALE 1:10,000	PLATE 2

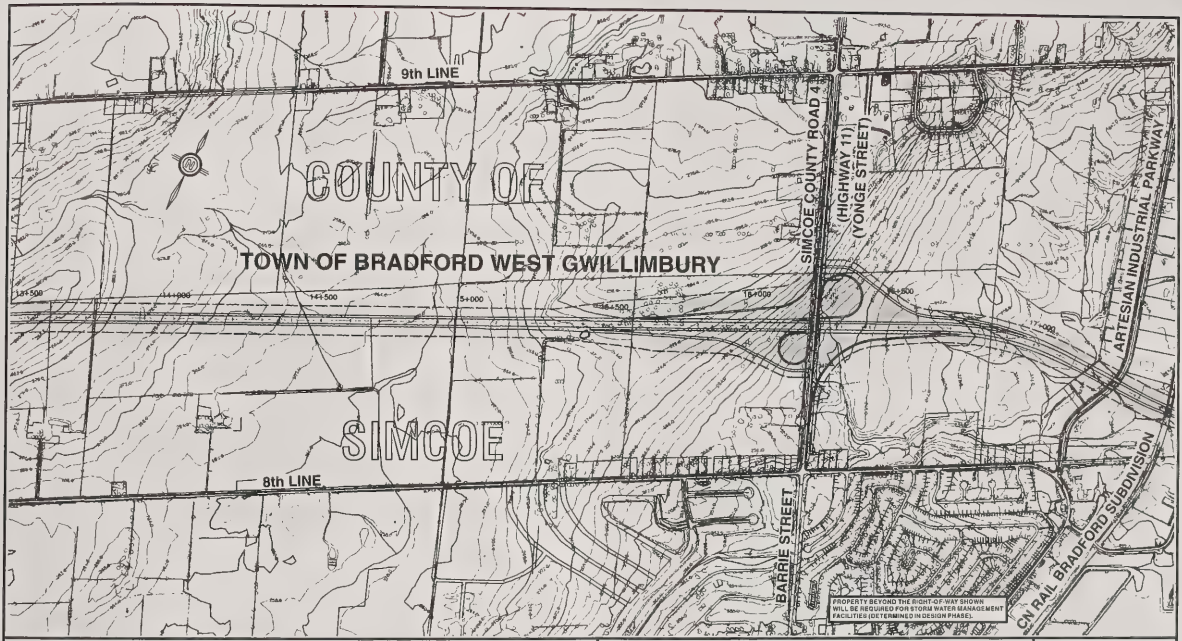


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2

SCALE H = 1:10,000 V = 1: 1,000

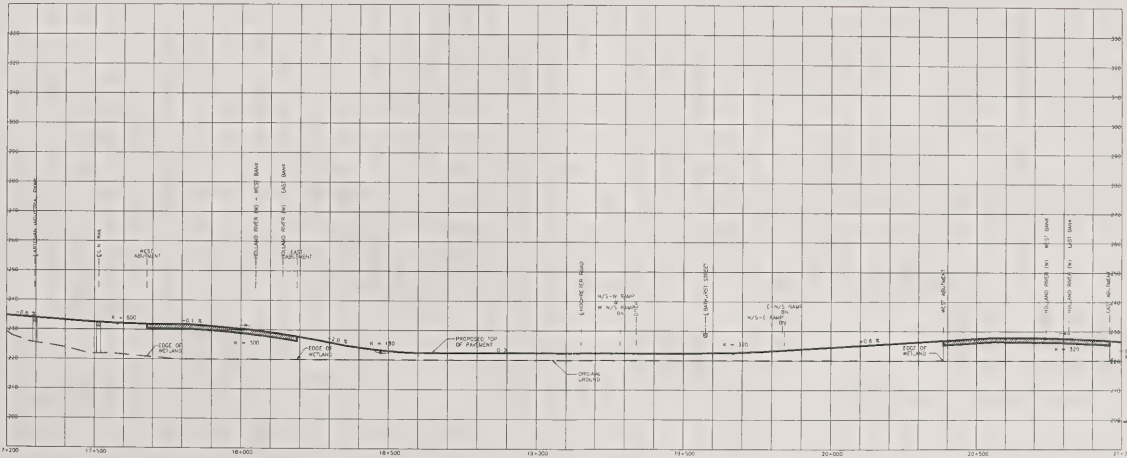
PLATE 3



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

KEY MAP

EXHIBIT 5-2	
SCALE 1:10,000	PLATE 4

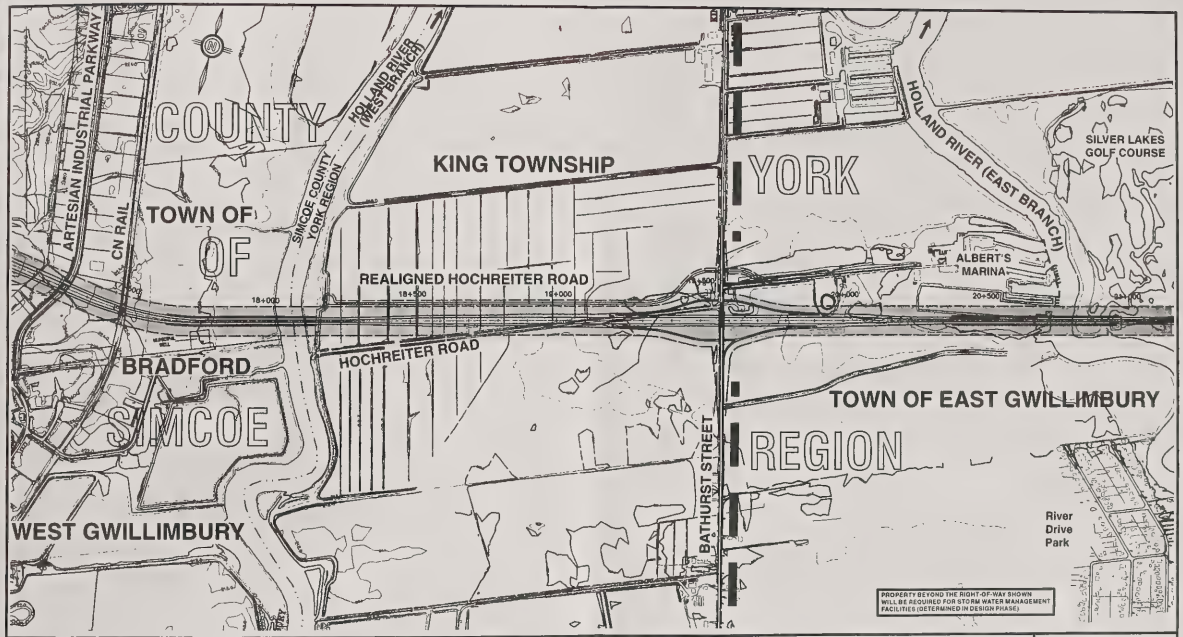


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2

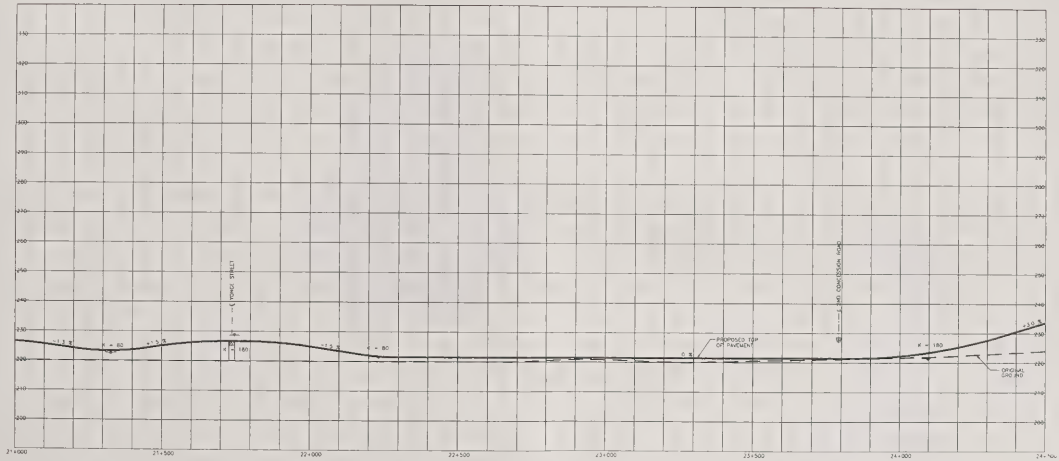
SCALE H = 1:10,000 V = 1: 1,000

PLATE 5



HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2	
SCALE 1:10,000	PLATE 6

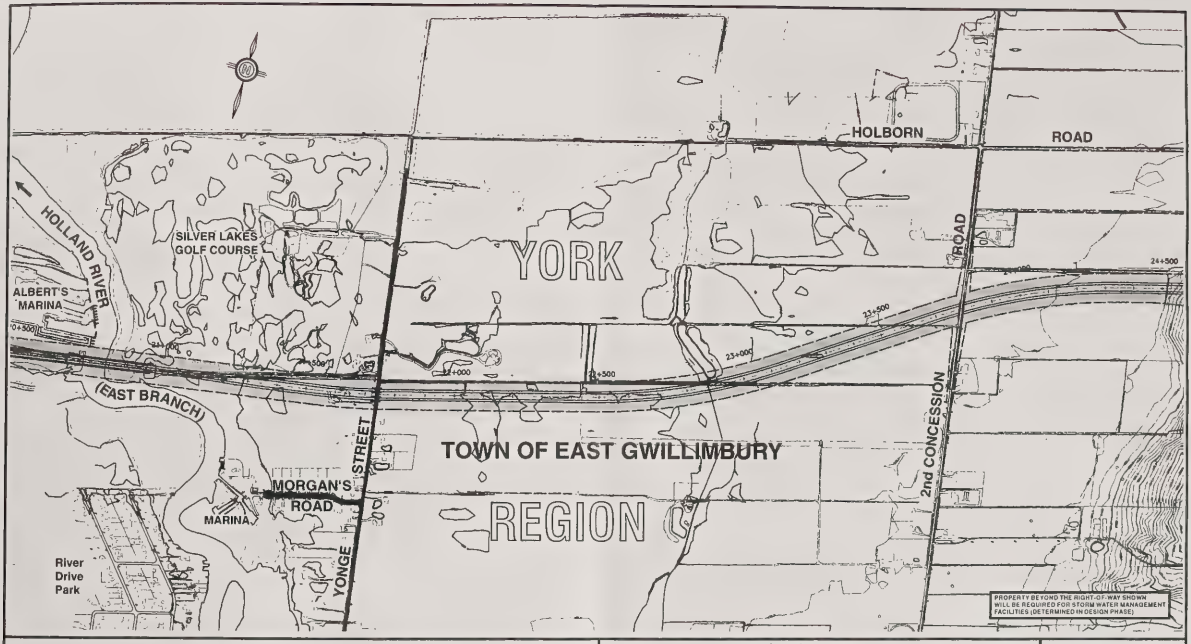


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2

SCALE H = 1:10,000 V = 1:1,000

PLATE 7

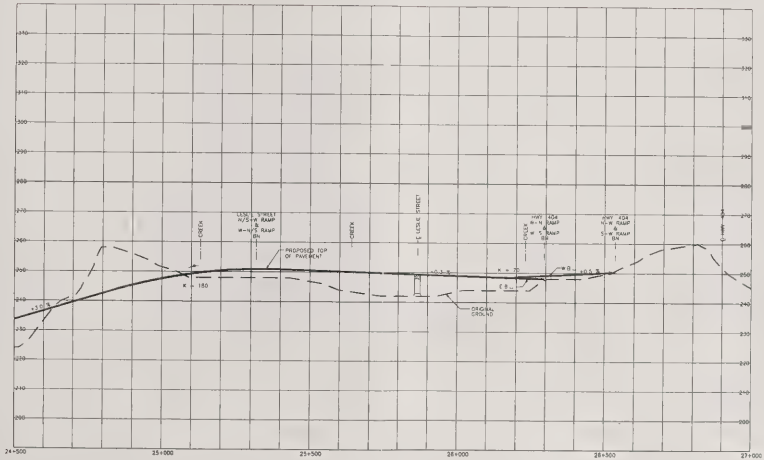


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

KEY MAP

EXHIBIT 5-2

SCALE	PLATE
1:10,000	8

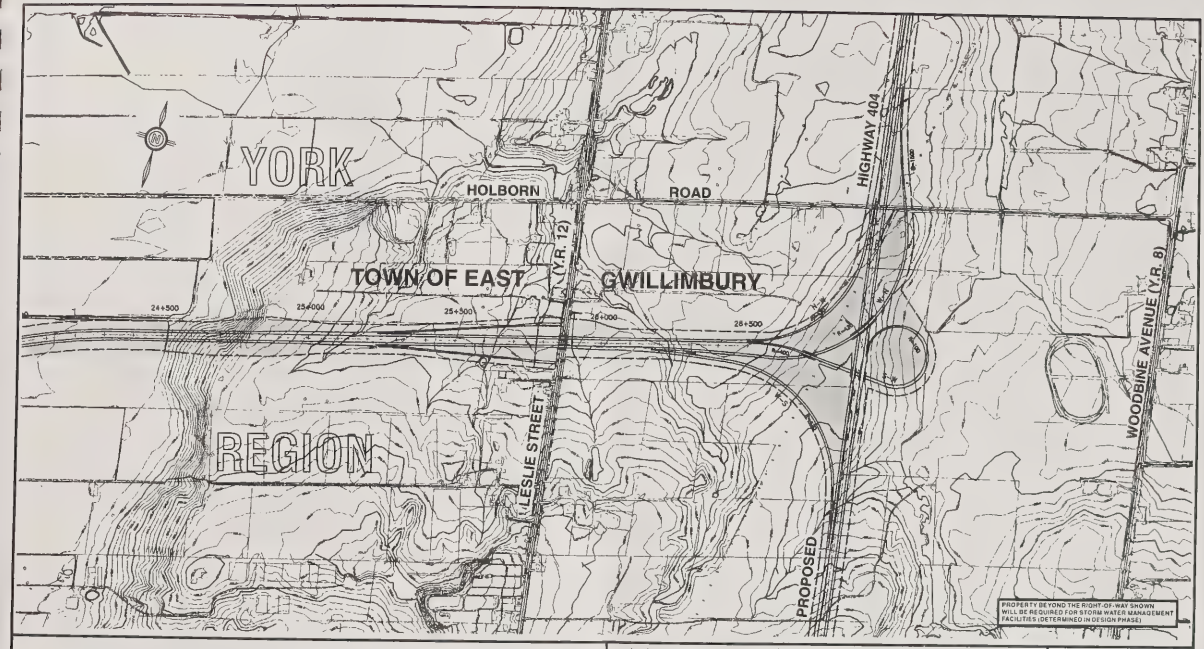


HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

EXHIBIT 5-2

SCALE H = 1:10,000 V = 1: 1,000

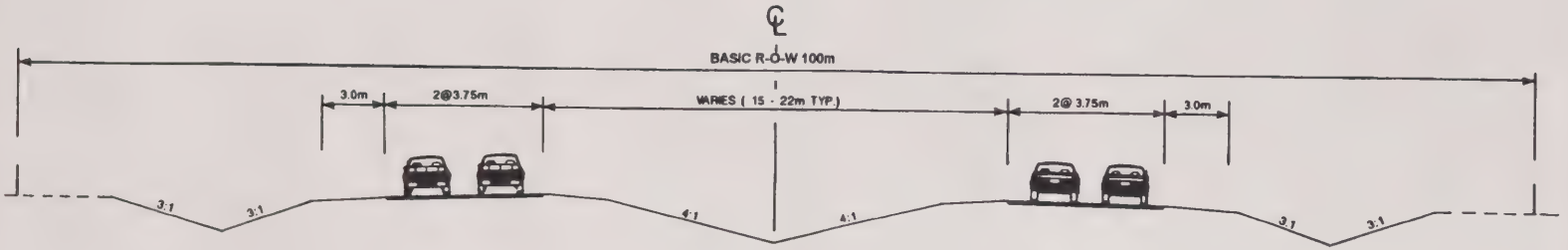
PLATE 9



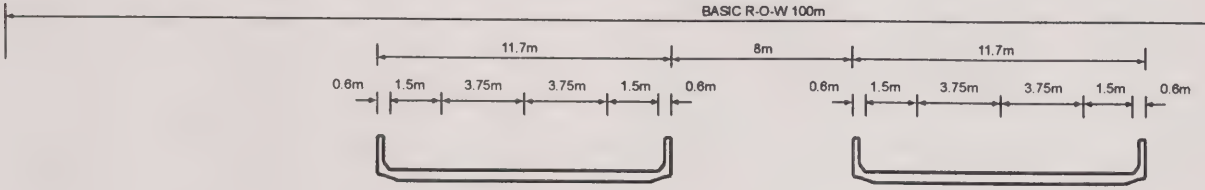
HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

KEY MAP

EXHIBIT 5-2	
SCALE 1:10,000	PLATE 10



4 LANE DIVIDED-GRASSED MEDIAN



4 LANE DIVIDED-HOLLAND RIVER STRUCTURES

N. T. S.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY	TYPICAL CROSS SECTIONS	EXHIBIT 5-3

Leslie Street

The proposed partial Diamond interchange of the Link with Leslie Street is shown on Plate 10. The Link will pass over Leslie Street via two 2-lane structure and ramps will permit the W-N/S and N/S-W moves. The E-N/S and N/S-E moves cannot be implemented due to the close proximity of the proposed interchange with Highway 404 to the east. The E-N/S and N/S-E demand at Leslie Street can be accommodated via the proposed Highway 404 interchange with Queensville Sideroad to the south or Woodbine Avenue to the north.

Each ramp will be single lane with the provision for the W-N/S ramp terminal at Leslie Street to be widened to 2 lanes. Because of the high volumes on Leslie Street, ramp terminal intersections will likely be signalized.

Highway 404

Plate 10 shows the Link's proposed interchange with Highway 404. The interchange will provide all freeway-to-freeway moves via direct 2-lane ramps, with the exception of the S-W ramp which will be a 2-lane inner loop design. The direct ramps will have a design speed of 100 km/h. The inner loop will have a design speed of 80 km/h. All ramps will narrow to 1 lane at entrance terminals.

The design of the interchange requires the proposed interchange at Queensville Sideroad as per the Highway 404 Extension EA - (Plate 5) to be redesigned to eliminate weaving conflicts.

Similar to the interchange with Highway 400 the first stage of construction (refer to Section 5.2.3) as a 2-lane arterial highway ramp will be single lane and the W-N move will be accommodated by sharing the S-W inner loop 2-lane underpass of Highway 404 forming a Trumpet design interchange.

5.2.3 Staging

As with most large transportation projects, there is the opportunity to stage the construction of the facility so as to meet evolving traffic/travel demands and to spread out the capital expenditures required.

A possible staged approach for constructing the Link would be to first operate the facility as a 2-lane arterial highway and then as demand requires, complete the four-laning of the highway.

If such a staging approach were selected, the Ministry would typically design and construct only one direction of the ultimate four-lane divided freeway and operate it as a 2-lane two-way arterial highway. An example is Highway 16/416 south of Ottawa, or Highway 69/400 near Severn River. The two-lane facility would be connected to both Highway 400 and Highway 404 with interchanges with the structures forming the base for the ultimate interchange configuration.

Normal practice would be to provide an at-grade signalized intersection or a grade separation and partial interchange at the location of each future interchange. Where future grade-separated crossings are planned (e.g. Yonge Street) it would be desirable to provide the future flyover in the

initial stage, so that the situation whereby access to the Link is provided initially and later removed (i.e. upon upgrade to freeway status) does not arise. At locations of future interchanges such as County Road 4 (Highway 11), the two-lane section may be aligned so as not to interfere with construction of the future structure.

This staging concept was shown to the public during the third round of review.

As part of Stage 2 construction, the Ministry would complete interchanges at Highway 400 and 404, construct interchanges and twin overpasses at other crossing road locations, and separate east and westbound traffic with construction of two lanes in the opposite direction.

Other staging options exist but staging does not, of itself, affect the need, purpose, or approvals required for the undertaking.

5.2.4 Structures

Structures will be required at interchanges, at crossing roads to provide continuity with the local road system, the CN Rail Newmarket Subdivision in Bradford and both branches of the Holland River.

Structures are required as follows:

Highway 400:

1. Two lane structure carrying N-E (loop) ramp over 400
2. Two lane structure carrying E-S ramp over 400
3. Single lane structure carrying N-E ramp over two-lane E-S ramp

10 Sideroad:

4. Twin two lane structures carrying 400-404 Link EB and WB lanes over two lane 10th Sideroad

County Road 4 (former Highway 11):

5. Four lane structure carrying Highway 11 over divided four lane freeway

Artesian Industrial Parkway:

6. Twin two lane structures carrying 400-404 Link EB and WB lanes over two lane Artesian Industrial Parkway

CN Rail:

7. Twin two lane structures carrying 400-404 Link EB and WB lanes over single track CN Rail line (plus potentially a two lane service road adjacent to the east side of the rail right-of-way) Refer to discussion under "Railways" in Section 5.2.8.

Holland River:

8. Twin two lane decks on a set of common piers carrying 400-404 Link over Holland River. Main span provides 65′ (19.8 m) wide opening and 22.5′ (6.86 m) vertical clearance above water level 718.83′ GSC based on Canadian Coast Guard direction. Potential exists for a

two lane road to use the easternmost span as an access from realigned Hochreiter Road to the agricultural field on the other side of the Link.

Bathurst Street:

9. Single two lane structure carrying Bathurst Street over divided four lane freeway

Holland River East Branch:

10. Twin two lane decks on a set of common piers carrying 400-404 Link over Holland River. Main span provides 65′ (19.8 m) wide opening and 22.5′ (6.86 m) vertical clearance above water level 718.83′ GSC per Canadian Coast Guard direction.

Yonge Street:

11. Twin two lane structures carrying 400-404 Link EB and WB over two lane Yonge Street

2nd Concession:

12. Single two lane structure carrying Second Concession Road over divided four lane freeway

Leslie Street:

13. Twin two lane structures carrying 400-404 Link EB and WB over four lane Leslie Street

Highway 404:

14. Two lane underpass carrying S-W ramp under Highway 404
15. Two lane structure carrying W-N ramp over Highway 404
16. One lane structure carrying W-N ramp over two lane S-W ramp

5.2.5 Drainage

The development of a detailed drainage plan for this project will be carried out during the design phase when sufficient detail is available to assess impacts and develop a mitigation strategy. A detailed stormwater quality and quantity management plan will be prepared at that time.

Consultation with the Ministry of the Environment (MOEE), Ministry of Natural Resources (MNR) and the Lake Simcoe Region Conservation Authority (LSRCA) will be required regarding the terms of reference for the stormwater management plan study before initiation of the design phase. The standards, policies and regulations in place at the time of design phase will govern the stormwater management provisions and approval requirements.

The 400-404 Link will cross the Holland River upstream (south) of the confluence of the Holland River and the East Holland River. The width of the Regulatory floodplain at this point exceeds 4.0 km. Flood depths and velocities are both low. The crossing will primarily consist of fill to raise the roadbed above the Regulatory flood elevation, with bridges placed at each of the two river crossings. Drainage work was advanced to a concept plan level at the two major river crossings where a hydraulic analysis was completed to determine the potential impact of the Link on upstream flood elevations. It is detailed in Appendix F and is summarized below.

To assess impacts on flood elevations, HEC2 hydraulic models were set up for both the Holland River and the East Holland River. Data was generated from the best available mapping including the 1:5000 Flood Plain Maps provided by the Lake Simcoe Region Conservation Authority. Starting flood elevations were based on the downstream Regulatory flood elevations illustrated on the Flood Plain mapping. The Regulatory flood flows were set at 460 m^3/s for the Holland River and 944 m^3/s for the East Holland River.

The hydraulic analysis was completed for alternative bridge spans, ranging from 500 m to 1000 m. The expected increase in upstream flood elevations for the East Holland River ranges from zero for a 1100 m span to 0.16 m for a 500 m structure. The increase for the Holland River ranges from zero for a 900 m structure to 0.12 m for a 500 m span.

The completed analysis provides a preliminary assessment of potential increases in flood elevations. However, a more comprehensive analysis will be required as part of subsequent design phases to ensure the structures are sized appropriately. As part of those future studies, alternatives may also be considered to improve hydraulic performance of the flood plain such that there is no net effect on flood risk as a consequence of the construction of the new roadway. These alternatives include but are not limited to: adding culverts at intermediate points to improve conveyance, alterations to vegetation adjacent to the structures to reduce resistance, and localized grading to improve capacity.

5.2.6 Operations

Interchanges on the Link are located such that there is adequate spacing to avoid lane changing conflict between entering and exiting traffic with the exception of the segment between Leslie Street and future Highway 404. Because of the Leslie Street interchange's close proximity to the interchange with the future Highway 404 only a partial interchange is proposed (access to and from the west only). Travel demand to/from the east can be accommodated via proposed Highway 404 interchanges at Queensville Sideroad to the south and Woodbine Avenue north of Boag Road.

Interchanges with the Link connecting to both Highway 400 and future Highway 404 have also been configured and located to minimize the potential for weaving conflicts on the north-south freeways.

Traffic signal justification will be analyzed for ramp terminal intersections as part of the design phase of the project.

If the Link is staged to operate as a two-lane arterial highway initially, signals will likely be required at all at-grade intersections. Connections at Highway 400 and 404 will operate as freeflow interchanges.

Depending on the year of implementation and on travel demand/land use patterns present at that time and thereafter, the introduction of the Highway 400-404 Link could influence traffic operations on major roads and intersections throughout northern York Region and southern Simcoe County as demonstrated in Exhibit 3-3 in Section 3.1.2.2 (d). Generally, traffic and safety conditions on arterial roads in the study area would improve upon the diversion of through traffic to the new route. In particular, intersections along Highway 88, Highway 11 south of Bradford and Queensville Sideroad would likely experience a significant drop in traffic (including nearly all heavy trucks).

Certain intersections such as Bathurst Street/Highway 11 in York Region and 8th Line/Highway 11 in Simcoe County may experience demand growth and/or changed turning patterns; the significance and impact of such changes will be largely determined by the changes to the future municipal road network which emerge from the updating of the Bradford West Gwillimbury and East Gwillimbury Official Plans in the interim.

Regulatory and guide signage for Link traffic will be provided in accordance with the policies and guidelines in place at the time of design. The need for, type, and location of guide signage for specific area attractions (Bradford business district, tourist attractions, recreation facilities, etc.) will be determined as part of the consultation process with interested parties in the design phase.

5.2.7 Right-of-Way Requirements

The conceptual right-of-way (ROW) requirements for the Highway 400-404 Link are shown on the design plates in Exhibit 5-2. A basic minimum 100 m ROW width is required; this width is typical for highways of this nature. The profile of the road alignment involves a variety of cut and fill sections; where these exceed the basic ROW width the property requirements are adjusted accordingly. Property beyond 100m will also be required for:

- crossing road grade separations and approaches;
- interchanges; and
- stormwater management facilities (determined in design phase)

Protection of property required for the right-of-way will occur following the filing of a controlled access highway designation plan and an associated order in council.

Access will be maintained to all properties directly affected by the Link. This may require the realignment of driveways to residential homes and field entrances adjacent to the Link.

Property Acquisition

One parcel of land on the southwest corner of Bathurst Street and Hochreiter Road will lose its present access from Hochreiter Road. It may be possible to provide access to this parcel via the property's Bathurst Street frontage or via an access road from realigned Hochreiter Road under the Holland River structure. Alternatively, it may be acquired in its entirety as part of the Link project for wetland or stormwater management purposes.

For highway projects, the Ministry typically will commence property acquisition for the required right-of-way two to three years prior to construction. In some cases, it may be necessary to purchase an entire property rather than just a portion which falls within the ROW. In these cases any surplus property will be disposed of according to standard Ministry policy.

For more information regarding property acquisition, reference may be made to the MTO brochure, "Highway Property Purchasing" or to the MTO Central Region Property Office.

5.2.8 Utilities and Railways

Utilities

Local utilities, such as hydro, water mains, sewers, telephone lines, etc. are located within the right-of-way of existing municipal roadways and may be crossed, but would not generally be affected by the highway. In the rural areas affected by the highway, utilities are generally limited to aerial hydro and telephone lines. It should be noted that the major study by Ontario Hydro of new transmission line corridors which was a significant issue early in the Link study was cancelled outright by Ontario Hydro in 1994 and was therefore eliminated as a concern. Utility authorities will need to be contacted during the design phase.

The Link will pass by the recently-opened municipal water well near the Holland River in Bradford. The Link will be on structure at that point. The piled foundations for pier footings will not extend deep enough to penetrate or otherwise affect the 140 m deep aquifer, and pier locations will be designed to avoid the pumphouse and well shaft. The Link is therefore not expected to affect Bradford's municipal water supply. This will be confirmed in the design stage via detailed foundation investigation studies.

Railways

The Highway 400-404 Link will extend over the CN Rail Newmarket Subdivision in Bradford. The Newmarket Subdivision is a little-used single track running north-south between the Holland River and Artesian Industrial Parkway. The future of the line is uncertain; its owner (Canadian National North America) plans to abandon the line between Bradford and Barrie and at the time of EA report preparation, there had been no offers to purchase the line. While the EA submission assumes the line will be in operation at the time of Link construction, its elimination would not affect the need, rationale, or timing of the undertaking. A minor profile adjustment and reduced structural cost due to the elimination of a structure at that location would result.

Should the corridor be approved for a land use other than railway, the MTO would not be in a position to provide funding for such uses. The owner/operator of the new land use would become responsible for justifying, planning, designing, construction, and funding a structure. The MTO would become an approval authority only.

If the line remains in use at the time of Link design and construction, consultation with the line's owner will be required at that time to review design and construction plans and to maintain operation as required during the construction period. GO Transit should also be involved at that time, to ascertain the status of the proposed relocation of the Bradford GO Train station to a point north of the Link crossing (as shown in Plates 92-94, "Conceptual Planning Study of Expanded Rail Service on CN Newmarket Subdivision Between Toronto and Barrie", Delcan for GO Transit, January 1992) and the related need for track and access improvements at the crossing.

5.2.9 Cost Estimate

While order-of-magnitude capital cost estimates were developed for each alternative Link segment as part of the analysis of alternatives, the concept plan for the entire project was not developed to a level of detail great enough to generate precise cost figures.

Nevertheless, in order to provide some sense of the costs involved in constructing 16.2 km of new freeway and its associated interchanges and river crossing structures, the following figures may be referred to. Costs for a possible initial two lane stage option, as discussed in Section 5.2.3, are included to demonstrate the ability to achieve the benefits of the new route at less cost in an earlier stage.

Table 5-1: Order of Magnitude Project Cost Estimate

Item	Order-of-Magnitude Capital Cost ($1996) ($M)		
	Initial Stage (Two Lane Road)	Second Stage (Twinning)	Total (Four Lane Freeway)
Road Construction	18	14	32
Structures	37	13	50
Property	18	0	18
Engineering & Contingency	11	5	16
TOTAL	**84±**	**32±**	**116±**

5.3 Stakeholder Consultation During the Design Phase

The following discusses the proposed actions to be taken during the design phase to address design and environmental issues. It should be recognized that the design phase of the undertaking may not occur for many years, or it may occur directly following the approval of the EA. Design and construction depend on the funding and priority placed on the extension of Highway 404 and subsequently on the 400-404 Link.

5.3.1 Stakeholder Participation

The MTO recognizes the sensitivities associated with the crossing of the major and minor watercourses in the study area, the need to minimize impacts through appropriate mitigation to ecological systems, local communities (including impacts from noise), heritage resources, agriculture, and the local economy. Therefore, the MTO is committed to involving affected stakeholders in the design process to ensure that the 400-404 Link is designed and constructed in a way that is responsive to these stakeholders' interests.

Since the design has not commenced, there is ample opportunity for meaningful stakeholder input. The following sets out the proposed consultation process.

Government/Technical Agencies

To ensure that the design process proceeds efficiently while ensuring that it is responsive to the goals of the affected agencies, the Ministry will require that the Highway 400-404 Extension Link design team meet with the affected agencies and municipalities. A representative from each of the affected agencies/municipalities who can make decisions on behalf of their organization will be consulted. The purpose of this consultation is to provide a forum through which environmentally related design, construction, maintenance and operation issues can be identified, discussed and resolved on an ongoing basis throughout the design and construction phase. Experience shows that this is an efficient and effective mechanism for ensuring that agency interests are properly addressed in the design and construction of the facility. In addition, these agencies have a mandate which includes environmental protection goals, thus ensuring that these goals are properly accounted for during the design. It will also ensure that new information collected through other studies is considered in the decision-making process.

The design team will meet with the technical advisory contacts on a regular basis during the design phase. Meetings may be held on-site as necessary to facilitate discussions. In addition, the technical advisory group will be consulted during the construction phase as issues arise that need discussion and resolution. A schedule of meetings will be established at the outset of consultation to ensure that stakeholders can effectively schedule their participation, and all meetings will be documented.

Municipal Involvement

Throughout the planning of this undertaking municipal staff and elected officials have been involved. As noted above, during the design and construction phases municipal staff will be consulted on an ongoing basis as issues arise. In addition, presentations will be made to municipal councils, as necessary.

Public Consultation

Interest groups and the general public have been kept informed of the progress of both the Highway 400-404 Extension Link and Highway 404 studies and have influenced the planning of the undertaking. In order to keep the public informed through the design phase and to allow for public input, public consultation sessions will be held during the design phase, as required. In addition, public notification of the commencement of construction will be provided.

5.3.2 The Design Process

The design is usually carried out in two phases - preliminary design and detail design. These two phases have traditionally followed one after the other. However they may be combined as an evolving process to accelerate design and construction. Since construction may occur over several years, design of the portion of the undertaking that will be constructed in a subsequent year may be done while previous portions are being constructed. This is especially true considering that construction of the Highway 400-404 Extension Link is dependent on completion of the Highway 404 Extension to north of Queensville Sideroad where it will connect with the Link.

Environmental Protection Objectives

Although the specifics of the objectives for protecting the environment will be refined during the design phase in consultation with external agencies and municipalities, Section 5.4 describes the environmental issues that have been identified thus far during the consultation process for this study as well as the mitigating measures which will address these issues. These have been developed in consultation with affected agencies.

Design

Early in the design phase, the design concepts are developed - addressing issues such as roadway cross section, general structural arrangement, structure types, spans, clearances, pier placement, site access, vertical and horizontal grades, interchange placement and configuration, and preliminary stormwater management plans. Exhibit 5-2 provides a starting point in that respect. In addition, during this phase property acquisition and archaeological and built heritage mitigation activities will be started if required, and geotechnical surveys will be carried out.

At the start of the design of each watercourse crossing, meetings will be held to discuss each agency's objectives with respect to the crossing. To facilitate these discussions, a table summarizing the potential effects and other issues related to the affected environment will be completed. This step is critical to ensuring that the design team and stakeholders have a common understanding of the issues, constraints and goals to be addressed by the design. The information to be considered includes: stream habitat classification and type at the crossing locations; habitat sensitivity level for fish at the crossing; system sensitivity downstream of the crossing location; stormwater management sensitivities at the crossing (including storage and passage of flood flows, water quality and erosion control); other environmental conditions (e.g. terrestrial habitat and corridors, groundwater conditions, public access, and Environmentally Significant Area features and functions); and engineering design constraints.

Alternative design concepts will be developed and evaluated on the basis of issues including environmental impacts, ability to mitigate environmental effects, transportation objectives, engineering requirements, constructability, and cost. A preferred design concept will be developed/refined in consultation with the stakeholders.

During this phase, initial mitigating measures and fishery habitat compensation plans (where required) will be developed in consultation with stakeholders. As well, the need for, and nature of follow-up monitoring will be determined in consultation with:

- Ontario Ministry of Natural Resources (MNR)
- Ontario Ministry of the Environment (MOEE)
- Canada Department of Fisheries and Oceans (DFO)
- Canada Department of the Environment (DOE)
- Lake Simcoe Region Conservation Authority (LSRCA)

Again, ongoing consultation will ensure that, as the details of the design are refined, agency concerns continue to be addressed.

5.3.3 Documentation of the Design Phase

When the design of a component of the undertaking has been completed, the specific commitments to environmental protection measures, ongoing consultation and follow-up monitoring will be documented in a "Design and Construction Report" and made available to the stakeholders for review and comment prior to the commencement of construction.

5.3.4 Construction Phase

Prior to construction, construction plans will be prepared to ensure that construction is carried out in accordance with the agreements reached during the design phase. This includes the implementation of environmental protection measures, restoration and/or compensation plans. Copies of construction plans will be made available to stakeholders for review and comment, prior to commencement of construction.

5.3.5 The Canadian Environmental Assessment Act

The Canadian Environmental Assessment Act (CEAA) requires that a CEAA approval be obtained for those projects requiring federal lands, federal funding, or specified federal approvals. The Highway 400-404 Extension Link project is expected to trigger CEAA because of three types of federal approvals. The review carried out under CEAA will be a Screening of the environmental affects, including cumulative effects, associated with the specific activities that trigger the Act.

During the design phase application will be made for federal approvals under the Navigable Waters Protection Act (NWPA) for the two Holland River crossings, and potentially the Canadian Transportation Act (CTA) for the crossing of CN's Newmarket Subdivision. Where required, these applications will be accompanied by suitable environmental and design reports that provide the necessary environmental information to conduct a screening under the Canadian Environmental Assessment Act (CEAA). In addition, where it is determined that harmful alteration of fish habitat will occur, authorization under the Federal Fisheries Act will be required. Issuance of this authorization also triggers CEAA. The potential Federal Approvals include the following:

The Crossings of the Holland River - NWPA

The two branches of the Holland River are the only navigable waterways affected by the undertaking. These crossings will require an authorization under the Navigable Waters Protection Act. This authorization is a trigger under CEAA and therefore a CEAA Screening will be required. The Canadian Coast Guard will be the Lead Responsible Authority for this screening. At the time of application for a NWPA approval, design and environmental impact and mitigation information will be provided so that both a CEAA Screening and the issuance of the NWPA Approval can be done.

The Crossing of the CN - Newmarket Subdivision

In the event that the CN Newmarket Subdivision is still in operation at the time of Link design and construction (see Section 5.2.8) and if an agreement can be reached with the rail line's owner, no approval decision by the CTA is required, and therefore there is no CEAA trigger. If however, an agreement cannot be reached, a decision will be required from the Canadian Transportation Agency. The requirement for this authorization triggers a CEAA Screening. Because the CEAA Screening cannot be done until a request for An Order to Construct is made, and because the request for the Order must contain design information, the actual CEAA screening must wait until the design information can be provided. The CTA can do a screening and issue a preliminary Order to Construct on the condition that more detailed design information is provided for their approval before construction begins. Therefore, a design and construction report may need to accompany the application for An Order to Construct, addressing the specific environmental assessment requirements as specified in the CTA's Environmental Assessment Guide.

Department of Fisheries and Oceans

Where it is determined that harmful alteration of fish habitat will occur, an authorization from the Department of Fisheries and Oceans (DFO) is required. Upon referral of a water crossing project to DFO for Authorization under the Fisheries Act, DFO will determine if an Authorization may be issued on the basis of the information provided and the mitigation and compensation measures proposed. Once a decision to issue an Authorization is made, the requirement for a CEAA screening is triggered. A detailed assessment of the stream crossings will be carried out during the design phase of the study. This analysis will be presented in a supplemental report that will be submitted with a proponent letter of intent, to DFO in support of the request for Authorization and the CEAA Screening. This report will be prepared in consultation with MNR, LSRCA, DFO and DOE and will address the detailed impact and mitigation measures, including any required mitigation and fisheries compensation.

5.4 Environmental Issues and Commitments

This section describes the Recommended Plan in terms of the potential environmental effects and mitigating measures, as well as any necessary commitments to further work. For ease of reference, the list of criteria used throughout the study in analyzing alternatives is used here to frame the discussion of issues. For a brief summary of the discussion in this Section, reference may be made to the table in Section 5.6.

5.4.1 Transportation

5.4.1.1 Traffic Operating Speed

Issue: Adequacy of facility to accommodate safe vehicle operating speeds
Identified by: MTO
Discussion: The 400-404 Link is planned as a multi-lane freeway with similar design objectives as other 400-series provincial freeways, for which the standard posted speed limit is 100 km/h. In recognition of safety issues and with consideration given to the potential for speed limits to be revised over the decades of Link operation, and given the opportunity to design to a high standard due to the relatively gentle topography along the route, there are no segments of the route which fall below 140 km/h design speed. This produces gradual horizontal and vertical curves in the alignment at only a minor incremental difference in cost from the typical 120 km/h design speed used in earlier freeways.

The direct ramps at the freeway-to-freeway interchanges use a 100 km/h design speed, thereby allowing smooth freeflow movement between facilities. Where constraints dictate use of inner loop ramps, large radii have been applied.

5.4.1.2 Traffic Volume

Issue: Adequacy of facility to accommodate future travel demand
Identified by: MTO
Discussion: As a typical four lane rural freeway, the Recommended Plan can accommodate up to 4,000 - 4,500 vehicles per hour per direction; on a daily basis, capacity is in the 70,000 - 100,000 range. The forecast demand volumes for the facility are well within this range for the foreseeable future (see Section 3.1.2.2 (d)). There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, peak recreational traffic demand, and diverted traffic from congested alternate routes.

5.4.1.3 Traffic Operations

Issue: Provision of adequate Level of Service for vehicular operations
Identified by: MTO
Discussion: The Recommended Plan is designed to provide a high standard of operational quality and safety to its users. In the two locations where lengthy upgrades must be traversed (eastbound between 2nd Concession and Leslie Street and westbound near County Road 4) the road profile grade has been limited to 3% and an auxiliary (truck climbing) lane has been included in the concept design in order to minimize the effects of slow-moving vehicles on traffic flow.

All at-grade intersections at the interchange ramp terminals will be signal-controlled if justified according to the provisions of the Ontario Manual of Uniform Traffic Control Devices (MUTCD). By attracting long distance and heavy truck traffic away from the municipal road network, traffic operations along those roads will be improved. Specifically, Queensville Sideroad, County Road (former Highway 11), Holland Street, and Highway 88 will be relieved of a significant portion of

through traffic, thereby reducing demand and improving Level of Service at signalized and unsignalized intersections along their length.

5.4.1.4 Safety

Issue: Design for safe operation of the facility
Identified by: MTO, OPP
Discussion: The Recommended Plan will feature all standard safety provisions of the day for high-speed provincial freeways as a design objective. Reference may be made to Sections 5.4.1.1 and 5.4.1.3 in that regard. The entire right-of-way will be fenced and use of the roadway by bicyclists, pedestrians, and slow-moving farm vehicles will be prohibited.

The design features related to road safety (pier protection, barriers, illumination, etc.) will reflect fully the provincial Design Standards and Policies in effect at the time of design.

Emergency routes will be maintained through retention of the existing road network, and improved by the presence of a new link in the road network.

The construction of the 400-404 Link will improve traffic operations on alternate roadways (see Section 5.4.1.3) which, when combined with the lower accident rate typically associated with a freeway, will result in a net reduction in vehicle accidents throughout the study area.

5.4.1.5 Efficiency

Issue: Minimization of out-of-way travel
Identified by: MTO, general public
Discussion: The analysis of alternative corridors and routes demonstrated that the proposed route is the most efficient of all reasonable alternatives, and will reduce out-of-way travel in the study area by providing a readily-accessed new link in the roadway network in a location where no direct east-west routes now exist. Travel on the new route will be high-speed non-stop steady flow (the most efficient travel pattern) and the efficiency of some existing roads will also improve with the diversion of traffic to the new route and consequent reduction in congestion (see Section 5.4.1.3).

5.4.1.6 Network Aspects

Issue: Provision of roadway continuity
Identified by: MTO
Discussion: As a freeway which links two other freeways, the Recommended Plan will provide a consistent facility type for long distance traffic in the south Lake Simcoe area. It will bridge the gap for east-west travel in the provincial highway network between Highway 400 and the proposed extension of Highway 404 north from Highway 407 to Lake Simcoe. The existing partial grid of municipal roads in the area of the proposed alignment will be linked to the new route at key points, and all existing crossing roads will remain open.

5.4.1.7 Financial

Issue: Affordability of roadway construction cost
Identified by: general public/MTO
Discussion: As an infrastructure project which will be amortized over many years and which will generate jobs during construction and travel time savings and other economic benefits for many years thereafter, the 400-404 Link represents a sound economic investment. Construction can be staged so as to spread the investment over several years. A decision to proceed with construction will be made by the Minister of Transportation in light of the funds available and priority of other provincial projects at that time.

5.4.1.8 Construction

Issue: Constructability of the facility, particularly across the Holland River valley
Identified by: MTO, general public
Discussion: The Recommended Plan's crossing of the lowlands surrounding both branches of the Holland River (from Artesian Industrial Parkway to east of 2nd Concession) will comprise a combination of structure and fill. Structure footings will be on deep piled foundations.

Detailed subsurface investigation along the route will be undertaken as part of the design phase, and embankment design and structural features will reflect the nature and composition of subsurface materials.

At the Highway 400 interchange, 400 will be able to stay in operation throughout the period of construction of the 400-404 Link.

5.4.1.9 Staging

Issue: Ability to create early benefits, meet immediate needs, and defer expenditure through staged construction
Identified by: MTO, municipalities, general public
Discussion: Among project supporters, there is considerable interest in advancing the construction timetable to generate an effective facility at as early a stage as possible. Many of the goals of the project would be achieved with an initial two lane roadway, and two-stage implementation would allow deferral of a significant proportion of the overall project cost. Conversely, if funding is not available for partial early implementation the result may be that when the project is finally constructed the travel demand at that time would warrant provision of the full four lane freeway and it would be built in a single stage as such.

Within an overall stage, interim completion of sub-sections may be possible, allowing the early opening of completed segments.

5.4.2 Natural Environment

The EA study that led to the selection and detailing of the Recommended Plan was undertaken with the full understanding of the Province's position in regard to watershed and subwatershed planning and the ecosystem approach to planning. Environmental and ecosystem issues were key determinants in establishing the Recommended Plan. A detailed natural environment biosphysical assessment of the Recommended Plan is included in Appendix G.

As will be seen below, this commitment will be carried forward into the design stage of the project.

General Commitments

At the outset of the design phase, the proponent will meet with MNR, LSRCA, and DFO staff to discuss concerns, review their work plan with respect to current standards, policies and regulations, and obtain any new information which may be applicable to the design phase. This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking.

Prior to implementation, the proponent will identify design and construction details for the undertaking to affected stakeholders. This will include identification of the schedule, the construction activities, the impact of these activities upon adjacent lands or watercourses, and the mitigation that will be employed to minimize the impacts. The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements.

Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with MNR, LSRCA, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.

5.4.2.1 Surface Water Systems

Issue: Minimize potential adverse impacts to surface water systems (physical characteristics, water quality and quantity)
Identified by: MTO, MNR, MOEE, DFO, LSRCA, interest groups, general public
Discussion:
Impacts - Long-span bridges will carry the proposed 400-404 Link across both branches of the Holland River. Other stream crossings will use appropriately designed culverts. The biological aspect of surface water resources are discussed under Sections 5.4.2.2 (Fisheries and Aquatic Habitat) and 5.4.2.4 (Wetlands). Stormwater Management is discussed in more detail in Section 5.4.6.1. The continuity of the surface water systems will be maintained.

The issue of maintaining navigability along both branches of the Holland River is addressed in Section 5.4.3.3 (Community Recreation). Water quality/quantity issues are discussed in Section 5.4.6.1.

Mitigation - The following standard construction practices related to protection of surface water systems will be applied, where appropriate to the construction of the proposed Link:

- design bridges and culverts that:
    - maintain the existing channel form or include a low flow channel where appropriate;
    - do not impede fish movement;
    - do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions;
    - minimize erosion and flood risk upstream and downstream of structure;
    - utilize open bottomed culverts in upwelling areas.
- develop plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.

5.4.2.2 Fisheries and Aquatic Habitat

Issue: Protect fish habitat during and following construction including no net loss of habitat
Identified by: MTO, MNR, DFO, LSRCA, interest groups, general public
Discussion:
Impacts - The sensitivity and abundance of fisheries resources were integral components of the route selection process and will remain so through the development of mitigation measures. By way of the Fisheries Act R.S.C. 1985 and Policy for the Management of Fish Habitat (1986), the Department of Fisheries and Oceans (DFO) mandates a "no net loss" of habitat approach to construction and post-construction activities around watercourses.

The Recommended Plan extends east-west and will cross several warmwater streams including two branches of the Holland River where there is the potential for a small loss of wetland area that may currently provide spawning habitat. The majority of drainage channels drain south to north. Within the two affected watersheds (Holland River and Maskinonge River), a number of smaller streams and agricultural drains that provide or may provide habitat for migratory warmwater species and or resident baitfish populations will be affected. Along the Recommended Plan streams were assessed in the field by a qualified fisheries biologist in the fall of 1996 and Spring of 1997. Key concerns during construction are the introduction of sediment, habitat disturbance and alteration of the stream banks and bed during structure placement.

Mitigation - The concerns noted above arise on most major roadway projects, thus general mitigation measures have been developed (MTO's Environmental Manual for Fisheries -working draft 1994). This will be used as a starting point for protection of watercourses during highway construction. During design, careful attention will be paid to the location of bridge piers so as to minimize disturbance to the river bed at the river crossings, and to minimize the impacts of the construction process (including those of any construction access routes). Standard construction practices for all watercourse crossings with fish habitat potential will be followed, as appropriate, such as:

- develop a fish management plan that maintains or enhances fish habitat
- plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance;
- plans that provide for watercourse realignments in dry conditions;
- timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods; and
- plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.

5.4.2.3 Vegetation

Issue: Removal and/or disturbance of vegetation and flora, along with fragmentation of large woodland blocks
Identified by: MTO, MNR, interest groups, general public
Discussion:
Impacts - Along the length of the Recommended Plan some impacts on natural vegetation was unavoidable. In several cases, avoiding a woodland would generate greater impact on agriculture through severances. Also several of the areas affected are early successional systems and were not evaluated as being significant in terms of flora or wildlife habitat.

The major area of concern for natural vegetation was the central section of the Recommended Plan where major vegetation blocks are found (both upland and wetland types). Fifteen natural heritage features were identified along the Recommended Plan, eleven of which contain natural vegetation ranging from early successional shrub thicket/old field system to submature to mature woodlands. Only two areas of natural vegetation will be completely removed (two small remnant deciduous forest units approximately 1 ha in total area). An important element of the process to select the Recommended Plan was to minimize impacts on large blocks of natural vegetation (both upland and lowland) and, consequently, to minimize impacts on the wildlife habitat associated with these areas.

Where possible, the larger blocks of vegetation were avoided. However, over the approximately 16.2 km route of the Recommended Plan, some impacts were unavoidable. Specifically, 22.1 ha of higher quality woodlands will be removed. The boundary of the Holland Marsh Environmentally Significant Area (ESA A16, C1) overlaps areas measured in various sections of the evaluation (i.e.

organic soils, significant vegetation communities, wetland, wildlife habitat). The total area of ESA affected by the proposed facility is 17.2 ha. It was not possible to avoid the ESA as it is located along both branches of the Holland River. The impact will not affect the status of the ESA. The Recommended Plan was routed where possible to areas of existing openings (road right-of-ways), areas of previous disturbance (Albert's Marina), or along the edge of vegetative blocks. The alignment will be on elevated structure across the Holland River branches to reduce impacts to the extent possible and maintain corridor connections.

Mitigation - Mitigative measures to be taken, where appropriate, during the pre-construction, construction and post-construction phases of the project are as follows:

- edge management plans for areas of new disturbance to protect remaining trees and re-establish edge;
- salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance;
- relocate rare, threatened or endangered plant species;
- minimize disturbance to remaining vegetation by felling trees into the working easement, leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas;
- maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat; and
- vegetation removal and protection of residual vegetation should be completed in accordance with Ontario Provincial Standard Specifications.

5.4.2.4 Wetlands

Issue: Crossing of the Holland Marsh Provincially Significant Wetland (PSW)
Identified By: MTO, MNR, LSRCA, MOEE, interest groups, general public
Discussion: Upon the initiation of the present study, the key environmental concern centred on the potential impacts of a new crossing of the Holland Marsh Wetland Complex, which is a Provincially Significant Wetland Complex. In the route generation stage of in the study, it was determined that it was not possible to avoid all impacts, therefore discussions with MTO/MNR scoped the consideration of alternatives to those that:

- cross only narrow sections of the Holland Marsh Wetland complex;
- utilize portions of the designated Holland Marsh that have been previously disturbed; and,
- use an elevated structure on piers rather than an earth fill embankment to cross the designated wetland.

The Holland Marsh Wetland Complex extends south along both branches of the Holland River throughout the study area. As a result, it was not possible to establish a routing alternative that did not affect the wetland on the approaches to the two river crossings. The task became one of minimizing the area of wetland affected and the loss of function in the area of impact. The three principles noted above were adhered to during the evaluation process.

Impacts - Approximately 9.5 hectares of the Holland Marsh Wetland Complex will be crossed by the Recommended Plan. The greatest effect is on the west bank (7.5 ha) where the route crosses three wetland types: shrub thicket (disturbed), tree swamp and marsh. The marsh area contains small areas of degraded fen. Fens and bogs are least common wetland types locally and sensitive to disturbance. Approximately 0.6 ha of degraded fen will be affected by the Recommended Plan. An undisturbed high quality fen area is avoided at the east Holland River crossing. The majority of wetland affected (8.9 ha) is composed of swamp and marsh community types. The main body (core) of the wetland to the north of the Recommended Plan will be unaffected.

The above area figures are based on a 100 m wide right-of-way designated for the route. As the facility will be on a piered structure, the area impacts will be less than that stated above. The long term impact will be significantly less and limited to widely spaced bridge piers.

Mitigation - In concert with the measures described herein to minimize impacts upon aquatic habitat, vegetation and water quality, particular attention will be paid at the design stage to maintaining the volume and pattern of water flow through the wetland (both surface water and groundwater). The post-construction restoration of areas affected by construction related activities (e.g. construction access, staging areas etc.) will also be a focal point of the mitigation efforts.

Access to the pier locations will be required during construction. The area disturbed will be restored to a wetland condition following construction. Even if the Recommended Plan is staged (initially 2 lane) the piers will be designed for the ultimate facility requiring wetland access only once during the life of the structure.

Mitigation will include the following commitments wherever appropriate:

- develop restoration plans for areas of wetland temporarily disturbed by construction
- installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians;
- delineation of areas to be protected with sediment fences to prevent intrusion during construction;
- timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and Ontario Game and Fish Act (1980);

- salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance;

- minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established; and

- retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland.

The MTO has committed to construct the facility as an elevated structure through the Holland Marsh which is a Provincially Significant Wetland.

Emphasis will be placed on minimizing backwater effects and maintaining groundwater flows and patterns, thereby minimizing longer term effects on the fen wetland type.

The close monitoring of all activities in the wetland along with ongoing site review efforts with the responsible agencies will be key elements of the design and construction process. Where feasible, wetland substrates will be salvaged for use in stormwater management facilities (e.g. substrate and seed bank for wetland creation in stormwater management ponds).

Elsewhere along the route where other wetlands are encountered, similar mitigative measures will be employed. However, the other wetlands not previously mapped as part of the Holland Marsh Provincially Significant Wetland Complex will be crossed mainly through the use of earth fill embankments rather than bridging. Efforts will be made to ensure, by way of the road design, that surface water drainage and shallow groundwater patterns are not subjected to major alterations. The wetlands outside the Provincially Significant Wetland are generally small linear features associated with minor drainage swales.

5.4.2.5 Wildlife

Issue: Species of concern may be affected by the Recommended Plan. The introduction of a freeway may lead to increased mortality in the wildlife community. Therefore, it is important to minimize wildlife habitat disturbance, minimize fragmentation of large habitat blocks and maintain corridor connections
Identified by: MTO, MNR, interest groups, general public
Discussion:
Impacts - The issue of maintaining wildlife habitat is directly linked to the maintenance of natural vegetation, wetlands and greenways. Wildlife habitat along the Recommended Plan is concentrated in the central section of the route (Holland River area). Elsewhere wildlife habitat is restricted to small, isolated deciduous woodlands, shrub thickets and old field systems. Of these areas, the wildlife is typical of an agricultural land mosaic with common open field and forest edge species. Thirty-nine hectares of habitat are removed by the Recommended Plan, however no interior habitat was present in the agricultural areas. No habitat type was completely removed. Sections of the affected habitat areas will be retained outside the ROW.

The major wildlife habitat zone is the area between and adjacent to the two branches of the Holland River. In this zone are large contiguous blocks of wetland and upland forest, thicket and successional area creating a diverse and extensive habitat area. Similar to the wetland component, an attempt was made to route the facility in existing openings in the forest block, in existing disturbed areas or along the edges of forest blocks. This was done to avoid fragmentation of large forest blocks.

While minimizing the impacts on wildlife habitat and movement was a key factor in the selection of the preferred route, the vegetation patterns in the area are such that some impacts are unavoidable. Wildlife mortality associated with the proposed Link can be expected. The Recommended Plan will remove 32.7 ha of significant wildlife habitat, and potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered Hawk) currently nesting in proximity to the proposed alignment. The corridor function of the two river branches (Holland River) and associated woodland/wetland could be affected. The crossing of the two rivers and associated PSW will be on a structure allowing movement of wildlife under the facility.

Mitigation - Given that the Recommended Plan will affect a variety of wildlife habitats a number of different mitigation measures will be applied. For example, by using available openings, skirting the large woodland blocks in the Holland River floodplain and using disturbed edge locations, habitat fragmentation in that area is minimized. The proposed long-span bridges across the Holland River branches will retain wildlife movement opportunities along the river banks. Avoidance has been a major mitigation measure applied to the route planning stage.

The drainage plan will minimize the ponding of salt-laden runoff, in order to decrease impacts on sensitive aquatic habitat for breeding amphibians and other species. To minimize road kills, measures will include a wide, grassed, open median, fencing of the right-of-way, provision of good visibility for drivers, and the consideration of cautionary wildlife crossing signage at key wildlife crossing locations.

Mitigation will include the following commitments wherever appropriate:

- design bridges and culverts that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors;

- restrict clearing of trees immediately adjacent to or within significant breeding areas to non-critical periods; and

5.4.2.6 Groundwater

Issue: Potential well impacts and contamination of/interference with groundwater resources
Identified by: MTO, MOE, York Region and Simcoe County Health Units, local municipalities, property owners
Discussion:
Impacts - Rural homes and businesses throughout the study area all currently utilize private wells; 19 rural residences, each assumed to have at least one private well, are potentially affected either directly (i.e. removal) or indirectly (i.e. potential interference) by the proposed route. More detailed well investigation to be done at the time of detail design may reveal additional wells used for agricultural purposes or shallow hand-dug wells that are not likely to be documented. In the area of sandy soils associated with the Holland River, the shallow perched groundwater system is susceptible to contamination and/or interference.

As discussed in Section 5.2.8, the Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway. The municipal well is fed by a deep aquifer well below the

depth of potential impacts associated with construction of the proposed Link. The structural and foundation options, construction techniques, and drainage patterns associated with the Link in the vicinity of the well will be the subject of thorough investigation at the design stage to ensure the current water supply is not adversely affected by the undertaking.

Mitigation - Mitigation measures to be considered will include:

- tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well travelled areas where soil compaction has occurred in areas that previously permitted infiltration;
- backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage particularly at river crossings;
- preparation of detailed stormwater management and groundwater protection plans at the design stage which address both quantity and quality;
- a well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply, if warranted;
- all wells or septic systems which require removal due to construction or isolation will be abandoned/decommissioned under the appropriate regulations in effect at the design stage;
- use of appropriate dewatering and spills avoidance management techniques by construction.

5.4.2.7 Greenways and Open Space Linkages

Issue: Minimize the disruption to existing greenways/natural corridors
Identified by: MTO, MNR, York Region, general public
Discussion: Natural corridors are more or less elongate, naturally-vegetated features that link or border larger natural areas. Corridors provide pathways for animals requiring a variety of habitats to complete their life cycles and allow for the movement and reproductive interchange between populations of plants and animals (Riley and Mohr 1994).

The Recommended Plan, is an east-west route traversing a landscape in which the main natural features are on a north-south axis particularly in the centre section of the study area, namely, the two branches of the Holland River and the associated wetlands and upland forest. In this area, the issue is related as much to the fragmentation of large natural areas as it is to the disruption of natural corridors. The discussion presented for vegetation (Section 5.4.2.3), wetlands (Section 5.4.2.4) and wildlife (Section 5.4.2.5) is also relevant here.

Where possible, the proposed alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the route crosses both branches of the Holland River and its associated wetlands it will be on a pier structure.

The sections of the route that will be on a structure provide important opportunities for the maintenance of the key natural features within the study area. Mitigative efforts will be focused on the restoration of natural vegetation disturbed by construction-related activities, where appropriate, thereby ensuring the continuity of the natural vegetation within the central portion of the study area.

5.4.2.8 Soil

Issue: Minimize the areas of high capability mineral soils (Class 1, 2, 3, 4) and specialty crop (organic muck) soils removed
Identified by: MTO, OMAFRA, agricultural property owners, general public
Discussion: In the segments of the study area to the west of the Holland River basin and east of the ridge formation the soils are consistently high capability loam and silty clay loam (Class 1, 2, 3, 4) and there are no distinct areas of lower capability soils where an alternative alignment would have a lesser impact. Current policies (Ministry of Municipal Affairs and Housing 1996, 1997) have shifted the emphasis to Class 1,2 and 3 (i.e excluding Class 4) as prime agricultural lands, however, to maintain consistency throughout the evaluation process, Class 4 has remained a component of the definition of high capability lands

Impacts - The proposed Link will remove 190.37 ha of high capability mineral soils from potential agricultural use. Between the river branches the soils include poorly drained shallow sandy soil (Class 4) and organic soils, both with excessive water limitations. The underlying clay is evident within the plough layer in some locations indicating that the depth of the organic deposits is being depleted. The proposed Link alignment utilizes an area of previous disturbance (Hochreiter Road) thereby minimizing although not eliminating impact; 9.3 ha of organic (muck) deposits are removed by the proposed Link.

Mitigation - There are no areas where lower capability soils provide a reasonable alternative route. The loss of higher capability soils is unavoidable. The area taken has thus been minimized.

Mitigation measures with respect to high capability soil conservation are related to appropriate construction techniques, erosion protection, topsoil stripping method (i.e. wet weather shut down) and spoil storage methods. Appropriate standards will be applied at time of construction and activities will be monitored. Topsoil salvage will be considered especially in areas where muck soils might possibly be used as a supplement in topsoil depleted areas adjacent to the right-of-way.

5.4.3 Social Environment

5.4.3.1 Aesthetics

Issue: Minimizing visual intrusion and maximizing attractiveness of new roadway.
Identified by: MTO, area residents
Discussion: The east-west freeway will introduce a new element to the study area landscape and as such parts of the route will be highly visible to existing and future residents, recreational users, and motorists. The route avoids one of the most sensitive areas in terms of visual impact - the Scanlon Creek Conservation Area - and the woodlots adjacent to the route in the Holland River lowlands will screen most medium-to-long views of the embankment and long bridges. In open rural territory such

as that east of Yonge Street to the glacial shoreline, the freeway will be visible; it is in such areas that landscaping within the right-of-way should be considered.

As the route passes north of Bradford, it will be on embankment and exposed to a view from the south, but it is likely that future expansion of urban development north of 8th Line will serve to screen the view of the facility from most existing residences. The long view from the hillside residential area north of Bradford (Grandview Estates) can not be screened, but the freeway would be viewed as one element in the larger picture.

The two river crossing structures will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans, and tapered piers; visual appeal to motorists and to those who may see the bridge from below will be a significant factor in selecting and detailing the bridge design.

An aesthetic benefit related to the route is the effect on downtown Bradford of the reduction of through traffic and heavy trucks from the main commercial arteries; this is a key element in the local HEART Committee's efforts to revitalize and beautify the downtown.

Another viewing highlight will be presented to 400-404 Link users on the approaches to the Holland River valley, as dramatic vistas open up to eastbound travellers as they approach County Road 4 and to westbound motorists as they crest the beach ridge west of Leslie Street.

5.4.3.2 Highway and Construction Noise

Issue: Minimizing impact of noise generated by the new highway on nearby residential areas.
Identified by: MTO, municipalities, area residents
Discussion: In accordance with the MTO Noise Protocol, an increase in future noise levels greater than 5 dBA with the new highway compared to future noise levels without the new highway was considered to be an environmentally significant issue. Therefore a detailed analysis of potential noise effects on Noise Sensitive Areas[5] (NSAs) in the vicinity of the alignment was carried out for the Recommended Plan. In this study's case, all identified NSAs are single family homes. An overview of the analysis is discussed in this section, however a more detailed description of the analysis is included in Appendix H.

Analysis - Noise levels were predicted for NSAs (homes) at what is referred to as a receiver location. The receiver is normally located in what is considered to be the OLA (e.g. backyard, patio deck, etc.) of the house in question. Houses beyond 600 m of the proposed alignment are not considered. Noise levels were predicted at receivers considered to be representative of the other homes around it (see locations shown on Exhibit 5-4).

Noise levels were predicted and compared for the following scenarios:

- future noise levels without the Link (Year 2021)

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5 NSAs must have an Outdoor Living Area (OLA) associated with the residential unit. The following land uses with OLAs, would qualify as NSAs: private homes, townhouses, apartment building, hospitals/nursing homes. Source: MTO Noise Manual.

- future noise levels with the Link (Year 2021)

For both scenarios the future noise level predictions include noise generated from traffic forecasts on adjacent crossing roads. Exhibit 5-5 provides a summary of predicted noise level ranges for the 24 hour period in specified areas adjacent to the right-of-way. It also includes the number of homes with increases in noise levels in the following ranges:

- 0-5 dBA increase;
- 5-10 dBA increase; and
- >10 dBA increase

Mitigation - Exhibit 5-5 indicated that approximately 49 of the 214 homes currently within 600 m of the proposed alignment will experience noise level increases greater than 5 dBA. An increase in noise levels greater than 5 dBA generally requires that noise mitigation be considered. The following describes MTO policy (MTO Noise Protocol) where increases exceed 5 dBA:

- investigate noise control measures within the right-of-way
- if project cost is not significantly affected, introduce noise control measures within the right-of-way
- noise control measures where introduced, should achieve a minimum of 5 dBA attenuation averaged over the first row of receivers (NSAs)

Given that the Recommended Plan has been developed only to a conceptual design level of detail the recommended noise mitigation strategy will be determined in subsequent phases of the project after the approval of this EA as per the MTO/MOE noise protocol. However, as part of this study, where there are opportunities for implementing noise control measures, including the type of control, they have been identified (see Appendix H). Types of noise control measures could include: noise walls; earth berms; and low noise pavement (open friction course).

It should be noted that once this EA is approved and the corridor designated by the MTO, noise mitigation for any subsequent development of an NSA (homes, hospitals, etc.) impacted by the freeway becomes the responsibility of the developer. The developer would have to adhere to current Provincial and applicable municipal noise guidelines.

With regard to construction noise, future construction activities will have the potential to result in temporary noise level increases (particularly in areas previously described as noise sensitive). Mitigation measures related to construction noise and vibration will be documented in a Design and Construction Report. At the design stage, the Ministry of Transportation (MTO) will carry out the following commitments:

- Noise sensitive areas will be identified.

- Applicable municipal noise control by-laws will be identified. Where timing constraints, or any other municipal by-law may cause hardship to MTO, an exemption will be sought.

HIGHWAY 400 TO HIGHWAY 404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

RECEIVER LOCATIONS

EXHIBIT 5-4

SCALE 1:50,000

NSA LOCALE	NUMBER OF NSAs WITHIN 600m OF PROPOSED ALIGNMENT				
Leq24hr	WITHOUT LINK	INCREASE WITH LINK IN PLACE			WITH LINK
		0-5dBA	5-10dBA	>10dBA	
HIGHWAY 400					
<45 dBA	6	5	1	0	0
45-50 dBA	2	2	0	0	1
50-55 dBA	0	0	0	0	7
55-60 dBA	2	2	0	0	0
>60 dBA	0	0	0	0	2
Subtotal by Locale	10	9	1	0	10
10 SIDEROAD					
<45 dBA	27	17	8	2	0
45-50 dBA	5	5	0	0	17
50-55 dBA	4	4	0	0	17
55-60 dBA	3	3	0	0	4
>60 dBA	8	8	0	0	9
Subtotal by Locale	47	37	8	2	47
COUNTY ROAD 4 (HWY.11)					
<45 dBA	26	11	15	0	1
45-50 dBA	9	9	0	0	10
50-55 dBA	0	0	0	0	24
55-60 dBA	8	8	0	0	8
>60 dBA	5	5	0	0	5
Subtotal by Locale	48	33	15	0	48
HOLLAND RIVER (west branch)					
<45 dBA	42	39	0	3	0
45-50 dBA	0	0	0	0	39
50-55 dBA	0	0	0	0	0
55-60 dBA	0	0	0	0	3
>60 dBA	0	0	0	0	0
Subtotal by Locale	42	39	0	3	42
HOLLAND RIVER (east branch)					
<45 dBA	33	24	4	5	5
45-50 dBA	0	0	0	0	19
50-55 dBA	0	0	0	0	4
55-60 dBA	0	0	0	0	4
>60 dBA	0	0	0	0	1
Subtotal by Locale	33	24	4	5	33
EAST of YONGE STREET					
<45 dBA	12	4	3	5	0
45-50 dBA	0	0	0	0	4
50-55 dBA	0	0	0	0	3
55-60 dBA	0	0	0	0	5
>60 dBA	0	0	0	0	0
Subtotal by Locale	12	4	3	5	12
EAST of 2nd CONCESSION ROAD					
<45 dBA	0	0	0	0	0
45-50 dBA	2	0	2	0	0
50-55 dBA	5	5	0	1	4
55-60 dBA	4	4	0	0	7
>60 dBA	11	10	0	0	11
Subtotal by Locale	22	19	2	1	22
TOTAL NUMBER OF NSAs	214	165	33	16	214

HIGHWAY 400 TO HIGHWAY404 EXTENSION LINK (BRADFORD BYPASS) ROUTE LOCATION AND ENVIRONMENTAL ASSESSMENT STUDY

NOISE ANALYSIS RESULTS

EXHIBIT 5-5

- An initial complaint from the public will require verification by MTO that the general noise control measures agreed to are in effect; MTO will investigate all noise concerns, warn the contractor of any problems, and enforce its contract.

- Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with MOE sound level criteria for construction equipment contained in the MOE Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.

- In selecting the appropriate construction noise control and mitigation measures, MTO will give consideration to the technical, administrative, and economic feasibility of the various alternatives.

- Where pile driving or blasting may be necessary in noise sensitive areas monitoring will be determined and adopted by Ministry of Transportation policy pursuant to prevailing provincial legislation at the time of construction.

5.4.3.3 Community Effects

Issue: Minimizing the negative impact of the new road on homes, community features, and recreational areas/practices.
Identified by: MTO, municipalities, interest groups, area residents, general public
Discussion: Homes: The route selection process had as a key objective the avoidance of residential properties. By travelling mid-concession and utilizing available gaps in the developed countryside, the number of individual homes which will be removed within the 16.2 km long proposed right-of-way was kept to 6 (two each at Yonge Street, Bathurst Street and County Road 4). The proximity-related effects of noise and visual intrusion for those homes near, but not within, the right-of-way are discussed in Sections 5.4.3.1 and 5.4.3.2. The property acquisition process is outlined in Section 5.2.7.

Community Features: The new route avoids entirely the area's community features such as schools, churches, cemeteries, parks and other public facilities. In improving access to Bradford and providing a new link across the Holland River valley, the facility will improve the attractiveness of existing features such as downtown Bradford

Recreational Areas/Practices: Existing recreational features are concentrated in the Holland River valley. The selected Link alignment responds to a significant community concern by avoiding the Scanlon Creek Conservation Area. The long-span high-level bridges across the two river branches will allow continuation of all water-based recreational activity such as boating, canoeing, fishing and birdwatching. Where the bridge passes by Albert's Marina particular attention will need to be paid to mitigation of noise and visual intrusion on marina users in the design phase (e.g. location/ elimination of expansion joints, pier and substructure aesthetics, road surface drainage, noise deflectors, etc.). Similar consideration will need to be given to the facility design in the vicinity of the Silver Lakes Golf Course.

5.4.4 Economic Environment

A detailed agricultural assessment of the Recommended Plan is included in Appendix G.

5.4.4.1 Agriculture

Issue: Preserve agricultural land and minimize negative impacts on agricultural operations.
Identified by: MTO, OMAFRA, agricultural property owners, general public
Discussion: Agriculture is the predominant land use in the study area affected by the proposed 400-404 Link. The significance of the agricultural industry with respect to the local economy was an integral component of the route selection process. The evaluation criteria emphasized the importance of minimizing land parcel severances, maintaining access to properties and continued viability of farming operations and farm community activities.

The western section of the study area is dominated by field crop and mixed farming operations. A total of 13 field crop and 3 livestock farming operations are affected by the proposed facility.

The central section (between the Holland River branches) is dominated by vegetable (specialty crop) production. East of the Holland River East Branch is an extensive area of turf production, also a specialty crop type, occupying an area of flat sandy soils that extends to a ridge formation east of 2nd Concession Road. East of the ridge, field crop and mixing farming practices again dominate the landscape. A total of 7 specialty crop, 3 livestock and 5 field crop operations are directly affected by the proposed Link in the east and central sections.

The total land area currently in active agricultural production that is directly affected by the proposed facility is 84.4 ha in the western section and 69.9 ha in the east and central section totaling 154.3 ha.

Mitigation - To minimize the negative effects of the route on agricultural operations and avoid major severances, the alignment is located mid-concession where possible, or along existing lot lines. The way in which lands were originally surveyed in Simcoe county and York Region differ and therefore, east of the west Holland River it was not possible to avoid all severance situations. Where impacts are evident, efforts were directed to maintaining access and continued viability of the farming operations in their present locations. Route location was the primary mitigation measure used at the route planning stage. Issues of farm access will be examined during the design phase.

5.4.4.2 Commercial/Industrial

Issue: Enhancing commercial/industrial sector while minimizing negative impact on local businesses, particularly downtown Bradford
Identified by: MTO, municipalities, interest groups
Discussion: The Bradford business community, through HEART and the Chamber of Commerce, has been an active participant in the route planning study. An economic impact study was undertaken (see Appendix I) which indicated that by the time of Link construction it would have little net negative effect on the economic viability of the town, and would in fact support commercial/industrial growth through improved access to the provincial freeway system and reduced

truck use of local streets. The Bradford business sector was found, through survey, to be locally-oriented and not dependent on tourist or through traffic. Part of the freeway plan will include, where appropriate, signage orienting traffic towards downtown Bradford.

The route passes through two lots on Artesian Industrial Parkway currently occupied by commercial businesses; they could be relocated to undeveloped lots nearby. The Recommended Plan will also impact property occupied by parts of Albert's Marina and the Silver Lakes Golf Club on either side of the Holland River East Branch, but the functional and economic viability of both enterprises will remain. Consultation with Albert's Marina and Liver Lakes Golf Club will be necessary during the design phase to minimize impacts to each business; some reconfiguration of the facilities within each property will be needed.

5.4.4.3 Special Land Use Strategies

Issue: Compatibility with Municipal Official Plans and land use strategies
Identified by: MTO, municipalities
Discussion: Four of the five municipalities directly affected by the Recommended Plan have updated or are in the process of updating their Official Plans over the course of the Link study. In each case - York Region, Simcoe County, Town of Bradford West Gwillimbury, and Town of East Gwillimbury - the future presence of the Link is noted and reflected in the transportation system capacity and related land use planning strategies. King Township's Official Plan has not been updated and does not address the Link, however only a small section of King between the Holland River and Bathurst Street is crossed, and municipal plans must be in conformity with upper tier plans (in this case, York Region's, which does include the Link at a conceptual level).

The Recommended Plan respects provincial policies concerning wetland crossings and avoids the Oak Ridges Moraine area of provincial interest.

5.4.4.4 Property Waste and Contamination

Issue: Avoidance of waste/contaminated sites
Identified by: MTO
Discussion: The proposed alignment avoids the only known landfill site in the study area (north side of 8th Line, west of the CN Rail line). However, it is possible that landfill waste or other contamination may be discovered during subsequent design or construction phases. Any waste material or contaminated soils encountered will include consultation with pertinent MOE district offices and will be managed in accordance with the requirements of applicable legislation, such as the Environmental Protection Act, and with applicable guidelines such as the MOE Guidelines for Use at Contaminated Sites in Ontario.

The management of any pre-existing contaminated soils will be consistent with MOE General - Waste Management Regulation 347 of the Revised Regulations of Ontario under the Environmental Protection Act.

With respect to the possibility of on-highway spills, their remediation is the responsibility of the owner of the spilled pollutant or the person having control of the pollutant at the time of the spill

(as per the Transportation of Dangerous Goods Protocol.) Measures to minimize the extent of accidental spills will be considered in the design of stormwater management facilities for the Link.

5.4.4.5 Aggregates

Issue: Avoidance of taking aggregate deposits out of current or potential production
Identified by: MTO
Discussion: There are no significant aggregate deposits on or adjacent to the proposed right-of-way. Because of the significant quantity of imported fill which will be required for the Link roadbed, construction of the Link will support aggregate production in nearby pits and quarries.

5.4.5 Cultural Environment

A detailed historical and archaeological assessment of the Recommended Plan is included in Appendix J.

5.4.5.1 Archaeology

Issue: Avoidance of known or potential sites of archaeological significance
Identified by: MTO, MC_ZCR, interest groups, general public
Discussion: The Recommended Plan, of necessity, traverses several north-south corridors of archaeological potential (e.g. Holland River East Branch, glacial lake shorelines) but there is only one known archaeological site within the right-of-way. Archival research in the area between the Holland River East Branch and Yonge Street has revealed that the route passes well to the north of the early 19th century steamboat landing and transshipment point, but archaeological fieldwork at this location has discovered a significant prehistoric/early historic site partly within the proposed right-of-way. The potential exists for other undiscovered archaeological sites at the Holland River East Branch and elsewhere within the proposed freeway right-of-way.

Once the specific nature and extent of archaeological resources impacted by the Link are identified, appropriate mitigation measures will be developed in accordance with the MTO/MC_ZCR guidelines.

5.4.5.2 Historical

Issue: Minimizing impact on significant historical elements of the built environment
Identified by: MTO, MC_ZCR, interest groups, property owners, general public
Discussion: The freeway route planning and refinement of the concept plan has had as a guiding principle the avoidance, where possible, of significant historical buildings and features. The result is that there are no such elements directly affected (within the proposed right-of-way).

Only one historically significant home (near Simcoe County Road 4) is within close proximity (less than 100 m) to the 16.2 km long new route, and a change in its context from the current agricultural setting will occur either with or without the freeway (the surrounding properties have been held for several years by development companies in anticipation of future Bradford expansion). Mitigation of visual impact of the Link through landscaping and other options will be explored in more detail, where appropriate, during the design phase of the project.

5.4.6 Applied Environmental Conditions

5.4.6.1 Stormwater Management

Issue: Management of roadway runoff and stormwater so as to reduce impacts to the quality and quantity of surface and groundwater
Identified by: MTO, MNR, LSRCA
Discussion: Stormwater runoff has the potential to severely impact the quality/quantity of surfacewater and groundwater. As is standard practice for a new roadway, a Stormwater Management Plan will be prepared during the design phase in accordance with MTO guidelines and in consultation with MNR, LSRCA, MOE and DFO.

The objectives of the Plan will include:

- When designing Stormwater Management Practices (SWMPs), consideration will be given to measures for reducing adverse environmental impacts to surfacewater and groundwater.

- Bridge runoff should be discharged to stormwater management facilities (preferably a pond or swale) prior to discharge to watercourses where this reasonably can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems.

5.4.6.2 Erosion and Sedimentation Control

Issue: Protection of terrestrial and aquatic resources through limitation/control of soil erosion and sedimentation.
Identified by: MTO, MNR, LSRCA
Discussion: Soil erosion and sedimentation can potentially harm terrestrial and aquatic resources. General design and mitigation principles of relevance to all new roadway construction are applicable in this case. These include the following objectives where appropriate:

- Consider the potential for destabilizing of banks due to groundwater and soils conditions, during the design stage and develop/implement mitigating strategies where required.

- Contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness.

The proposed right-of-way has been checked at locations of deep cut and fill to ensure that adequate property is shown to accommodate slope benching.

5.4.6.3 Sustainable Development

Issue: Avoidance of contributing to unsustainable development patterns
Identified by: MTO, general public
Discussion: Locations of freeways can contribute to unsustainable development patterns. This issue is primarily addressed to the need and justification and corridor selection stages of the planning

study. In that the Link responds to the travel demand needs generated by population growth and economic change in central southern Ontario, as shaped and defined by federal, provincial, and municipal land use policies, it cannot be isolated from the broader development picture. In supporting mobility of people and goods and in supporting the economic development of the study area (Bradford in particular), the Link may contribute to a reduction in dependence on long-distance commuting for residents of northern York Region as a significant proportion currently travel to jobs outside the area.

5.5 Process for Addressing New Concerns

The Ministry of Transportation (MTO), in submitting this Environmental Assessment to the Ministry of the Environment, has attempted to provide an appropriate level of detail about both the undertaking itself and the anticipated net environmental impacts. After approval under the Environmental Assessment Act is granted for an undertaking, MTO's standard approach is to initiate further technical investigations during the design phase of the project which generally occurs two to three years prior to construction. In addition to the more detailed technical work, further consultation with all stakeholders is also undertaken at that time. Issues and concerns which are raised during the design phase are to be documented and addressed in Design and Construction Reports which are filed for information purposes prior to any construction.

Although MTO has attempted to be as thorough as possible, there is a possibility that the detail design may identify significant environmental impacts which may not have been anticipated in the Environmental Assessment Report. These impacts may fall into either of two categories. The first category includes changes to the proposed undertaking which are required because of new information resulting from the detail design engineering and environmental investigations. The second category includes short term impacts which result from construction staging of the undertaking. The staging of construction is dependent upon financial resources, provincial priorities, and realized growth in demand, and can only be determined during the design phase.

MTO is committed to addressing the environmental concerns resulting from this undertaking whether identified in the Environmental Assessment Report or during the design phase prior to construction. MTO will screen all component projects of this undertaking during their detail design for new concerns. **New concerns are defined to include only those concerns which have not already been identified in this Environmental Assessment Report**. If MTO determines that a new concern is significant, then the Ministry will conduct the detail design for the affected project component of the undertaking under the Provincial Highways Class Environmental Assessment process. This formal process includes the preparation of an Environmental Study Report in place of a Design and Construction Report and provides the opportunity for formal agency and public review. Provisions within the Class Environmental Assessment allow for a "Bump-up" to an individual Environmental Assessment should serious environmental concerns remain unresolved. The intent of preparing an Environmental Assessment well in advance of construction is to allow for planned development within the study area while still protecting a route for the highway. **Therefore, where Class Environmental Assessment provisions are exercised, their application will be limited to the design and construction details related to the identified concern only and will not provide the opportunity to re-examine the route location or the balance of the design.**

5.6 Summary of Environmental Effects, Proposed Mitigation and Commitments to Further Work

Exhibit 5-6 provides a summary, based on the discussion in Section 5.4, of:

- environmentally significant issues;
- the concerned group or agency who identified the issue;
- the potential effects of the undertaking;
- the measures to be taken to mitigate the effects; and
- the commitments to further work and the agencies to be contacted in the future.

The steps which will be taken during the design phase of the project to address and finalize environmental commitments including the manner in which they will be dealt is described in Section 5.3.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
TRANSPORTATION				
Traffic Operating Speed (refer to Section 5.4.1.1)	Adequacy of facility to accommodate normal vehicle operating speeds	MTO	There are no segments of the route which fall below 140 km/h design speed. The direct ramps at the freeway-to-freeway interchanges use a 100 km/h design speed, thereby allowing smooth freeflow movement between facilities.	None
Traffic Volume (refer to Section 5.4.1.2)	Adequacy of facility to accommodate future travel demand	MTO	The 400-404 Link will accommodate up to 4,000 - 4,500 vehicles per hour per direction; on a daily basis, capacity is in the 70,000 - 100,000 range. There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, peak recreational traffic demand, and diverted traffic from congested alternate routes.	None.
Traffic Operations (refer to Section 5.4.1.3)	Provide for adequate Level of Service for vehicular operations	MTO	The 400-404 Link is designed to provide a high standard of operational quality and safety to its users. The road profile grade has been limited to 3% and an auxiliary (truck climbing) lanes have been included in the concept design. By attracting long distance and heavy truck traffic away from the municipal road network, traffic operations along those roads will be improved. Specifically, Queensville Sideroad, County Road 4 (former Highway 11), Holland Street, and Highway 88 will be relieved of a significant portion of through traffic, thereby reducing demand and improving Level of Service at signalized and unsignalized intersections along their length.	All at-grade intersections at the interchange ramp terminals will be signal-controlled if justified according to the provisions of the Ontario Manual of Uniform Traffic Control Devices.
Safety (refer to Section 5.4.1.4)	Design for safe operation of the facility	MTO, OPP	The 400-404 Link will feature all standard safety provisions of the day for high-speed provincial freeways. The construction of the Link will result in a net reduction in vehicle accidents throughout the study area.	The design features related to road safety (pier protection, barriers, illumination, etc.) will reflect fully the Provincial Design Standards and Policies in effect at the time of design. Use of the roadway by bicyclists, pedestrians, and slow-moving farm vehicles will be prohibited. Emergency routes will be maintained through retention of the existing road network, and improved by the presence of a new link in the road network.
Efficiency (refer to Section 5.4.1.5)	Minimize out-of-way travel	MTO, general public	The Link will reduce out-of-way travel in the study area by providing a readily-accessed new link in the roadway network in a location where no direct east-west routes now exist. Travel on the new route will be high-speed non-stop steady flow and the efficiency of some existing roads will also improve with the diversion of traffic to the new route.	None

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Network Aspects (refer to Section 5.4.1.6)	Provide for roadway continuity	MTO	The 400-404 Link will provide a consistent facility type for long distance traffic in the south Lake Simcoe area, and will bisect the gap for east-west travel in the provincial highway network between Highway 400 and the proposed extension of Highway 404. The existing municipal roads in the area of the link will be linked to the new route at key points, and all existing crossing roads will remain open.	None
Financial (refer to Section 5.4.1.7)	Affordability of roadway construction cost	general public/MTO	The project will generate jobs during construction and travel time savings and other economic benefits for many years.	A decision to proceed with construction will be made by the Minister of Transportation in light of the funds available and priority of other provincial projects at that time. Construction can be staged so as to spread the investment over several years.
Construction (refer to Section 5.4.1.8)	Constructability of the facility, particularly across the Holland River valley	MTO, general public	The Link crossings of the lowlands surrounding both branches of the Holland River will see a mixture of structure and fill. Structure footings will be on deep piled foundations.	Detailed subsurface investigation along the route will be undertaken as part of the design phase, and embankment design and structural features will reflect the nature and composition of subsurface materials.
Staging (refer to Section 5.4.1.9)	Ability to create early benefits, meet immediate needs, and defer expenditure through staged construction	MTO, municipalities, general public	Many of the goals of the project would be achieved with an initial two lane roadway, and two-stage implementation would allow deferral of a significant proportion of the overall project cost. Conversely, if funding is not available for partial early implementation the result may be that when the project is finally constructed the travel demand at that time would warrant provision of the full four lane freeway and it would be built in a single stage as such.	Within an overall stage, interim completion of sub-sections may be possible, allowing the early opening of completed segments.
NATURAL ENVIRONMENT				
General Commitment	High priority given to environmental work as design proceeds		Minimal long term environmental impact of the Link through design and mitigation.	At the outset of the design phase, the proponent will meet with MNR, LSRCA, and DFO staff to discuss concerns, review and update their workplan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase. This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking. Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of these activities upon adjacent lands or watercourses, and the mitigation that will be employed to minimize the impacts. The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Natural Environment General Commitment (cont'd)				Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with MNR, LSRCA, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.

Surface Water Systems (refer to Section 5.4.2.1)	Minimize potential adverse impacts to surface water systems (physical characteristics, water quality and quantity)	MTO, MNR, MOEE, DFO, LSRCA, interest groups, general public	Long-span bridges will carry the proposed 400-404 Link across both branches of the Holland River. Other stream crossings will use appropriately designed culverts.
			
			The continuity of the surface water system will be maintained.
				Where appropriate:
				• design bridges and culverts that:
				  • maintain the existing channel form or include a low flow channel where appropriate;
				  • do not impede fish movement;
				  • do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions;
				  • minimize erosion and flood risk upstream and downstream of structure;
				  • utilize open bottomed culverts in upwelling areas.
				• develop plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.

Fisheries and Aquatic Habitat (refer to Section 5.4.2.2)	Protect fish habitat during and following construction including no net loss of habitat	MTO, MNR, DFO, LSRCA, interest groups, general public	The 400-404 Link extends east-west and will cross several warmwater streams including two branches of the Holland River where there is the potential for a small loss of wetland area that may currently provide spawning habitat. Within the two affected watersheds (Holland River and Maskinonge River), a number of smaller streams and agricultural drains that provide or may provide habitat for migratory warmwater species and or resident baitfish populations will be affected. Key concerns during construction are the introduction of sediment, habitat disturbance and alteration of the stream banks and bed during structure placement.	Where appropriate: • develop a fish management plan that maintains or enhances fish habitat • plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance; • plans that provide for watercourse realignments in dry;

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Fisheries and Aquatic Habitat (cont'd)				• timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods; and • plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction.
Vegetation (refer to Section 5.4.2.3)	Removal and/or disturbance of vegetation and flora, along with fragmentation of large woodland blocks	MTO, MNR, interest groups, general public	Where possible, larger blocks of vegetation were avoided. However, 22.1 ha of higher quality woodlands will be removed. The total area of the Holland Marsh ESA affected by the proposed facility is 17.2 ha. The impact will not affect the status of the ESA. The Recommended Plan was routed, where possible, to areas of existing openings, areas of previous disturbance, or along the edge of vegetative blocks.	Where appropriate: • edge management plans for areas of new disturbance to protect remaining trees and re-establish edge; • salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance; • relocate rare, threatened or endangered plant species; • minimize disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas; and • maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat. • vegetation removal and protection of residual vegetation should be completed in accordance with Ontario Provincial Standard Specifications;

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Wetlands (refer to Section 5.4.2.4)	Crossing of the Holland Marsh Wetland Complex	MTO, MNR, LSRCA, MOEE, interest groups, general public	9.5 ha of Provincially Significant Wetland (PSW) will be crossed by the right-of-way; the remaining 8.9 ha is composed of marsh and swamp community types. The above figures refer to the total land area taken by the 100 m right-of-way to be designated for the route. In fact, the direct physical impacts will be significantly less and will be limited to the construction of widely separated bridge piers. Fens are the most sensitive land use types along the route, being dependent on the shallow lateral movement of groundwater. Only a small area of degraded fen is potentially affected.	Maintaining of the volume and pattern of water flow through the wetland (both surface water and groundwater) and the post-construction restoration of areas affected by construction related activities will be a focal point of the mitigation efforts. Commitments include, where appropriate: • develop restoration plans for areas of wetland temporarily disturbed by construction • installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians; • delineation of areas to be protected with sediment fences to prevent intrusion during construction; • timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and Ontario Game and Fish Act (1980); • salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance; • minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established; and • retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland. The MTO has committed to construct the facility as an elevated pier structure through the PSW. Emphasis will be placed on minimizing backwater effects and maintaining groundwater flows and patterns, thereby minimizing longer term effects on the fen wetland type.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Wetlands (cont'd)				Monitoring of all activities in the wetland along with ongoing site review efforts with the responsible agencies will be key elements of the design and construction process. Where feasible, wetland substrates will be salvaged for use in stormwater management facilities (e.g. substrate and seed bank for wetland creation in SWM ponds). Where other wetlands are encountered, similar mitigative measures will be employed. Efforts will be made to ensure, by way of the road design, that surface water drainage and shallow groundwater patterns are not subjected to major alterations.
Wildlife (refer to Section 5.4.2.5)	Minimize wildlife habitat disturbance, minimize fragmentation of large habitat blocks and maintenance of wildlife corridors	MTO, MNR, interest groups, general public	The proposed 400-404 Link will remove 32.7 ha of significant wildlife habitat, potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered Hawk) currently nesting in proximity to the recommended plan, and potentially interrupt wildlife movement along some stream corridors and woodlots, particularly in the area between Highway 400 and Simcoe County Road 4 (Highway 11).	By using available openings skirting the large woodland blocks in the Holland River flood plain and using disturbed edge locations, habitat fragmentation in that area is minimized. The proposed long-span bridges across the Holland River branches will retain wildlife movement opportunities along the river banks. The drainage plan will minimize the ponding of salt-laden runoff, and decrease impacts on sensitive aquatic habitat for breeding amphibians and other species. To minimize road kills, measures will include a wide, grassed, open, median, fencing of the right-of-way, provision of good visibility for drivers, and the consideration of cautionary wildlife crossing signage. Commitments include, where appropriate: • design bridges and culverts that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors; • restrict clearing of trees immediately adjacent to or within significant breeding areas to non-critical periods; and • monitor wildlife movement patterns and potential areas of conflict.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Groundwater (refer to Section 5.4.2.6)	Potential well impacts and contamination of/interference with groundwater resources	MTO, local municipalities, property owners	24 domestic wells are potentially affected either directly (i.e. removal) or indirectly (i.e. potential interference) by the proposed Link. In the area of sandy soils associated with the Holland River, shallow perched groundwater system is susceptible to contamination and/or interference. The Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway.	• tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well travelled areas where soil compaction has occurred in areas that previously permitted infiltration; • backfilling of excavations that intercept existing ground water flow with porous granular material to maintain existing ground water linkage particularly at river crossings; • detailed stormwater management plans which address both quantity and quality; • a well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply; and • use of appropriate dewatering and spills avoidance management techniques.
Greenways and Open Space Linkages (refer to Section 5.4.2.7)	Minimize the disruption to existing greenways/natural corridors	MTO, MNR, York Region, general public	The Link is an east-west route traversing a landscape in which the main natural features are on a north-south axis particularly in the centre of the study area, namely, the two branches of the Holland River and the associated wetlands and upland forest. Where possible, the Link alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the Link crosses both branches of the Holland River and its associated wetlands it will be on a pier structure.	Mitigative efforts will be focused on the restoration of natural vegetation disturbed by construction-related activities, thereby ensuring the continuity of the natural vegetation within the central portion of the study area.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Soil (refer to Section 5.4.2.8)	Minimize the areas of high capability mineral soils (Class 1, 2, 3, 4) and agricultural organic (muck) soils removed	MTO, OMAFRA, agricultural property owners, general public	In the segments of the study area to the west of the Holland River basin and east of the ridge formation the soils are consistently high capability loam and silty clay loam (Class 1, 2, 3, 4) and there are no distinct areas of lower capability soils where an alternative alignment would have a lesser impact. The proposed Link will remove 190.37 ha of high capability mineral soils from potential agricultural use. Between the river branches the soils include poorly drained shallow sandy soil (Class 4) and organic soils, both with excessive water limitations. The underlying clay is evident within the plough layer in some locations indicating that the depth of the organic deposits is being depleted. The proposed Link alignment utilizes an area of previous disturbance (Hochreiter Road) thereby minimizing although not eliminating impact; 9.3 ha of organic (muck) soil are removed by the proposed Link.	There are no areas where lower capability soils provide a reasonable alternative route. The loss of higher capability soils is unavoidable. The area taken has thus been minimized.
SOCIAL ENVIRONMENT				
Aesthetics (refer to Section 5.4.3.1)	Minimize visual intrusion and maximize attractiveness of new roadway	MTO, area residents	The route avoids one of the most sensitive areas in terms of visual impact - the Scanlon Creek Conservation Area - and the woodlots adjacent to the route in the Holland River lowlands will screen most medium-to-long views of the embankment and long bridges. Future expansion of urban development north of 8th Line will likely serve to screen the view of the facility from most existing residences. The long view from the hillside residential area north of Bradford (Grandview Estates) can not be screened. The effect on downtown Bradford of the reduction of through traffic and heavy trucks from the main commercial arteries; this is a key element in the local HEART Committee's efforts to revitalize and beautify the downtown. Another viewing highlight will be presented to Link users on the approaches to the Holland River valley, as dramatic vistas open up to eastbound travellers as they approach County Road 4 and to westbound motorists as they crest the beach ridge west of Leslie Street.	In open rural territory the freeway will be visible; it is in such areas that landscaping within the right-of-way should be considered. The two river crossing structures will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans, and tapered piers; visual appeal to motorists and to those who may see the bridge from below will be a significant factor in selecting and detailing the bridge design.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Highway Construction Noise (refer to Section 5.4.3.2 and Appendix H)	Minimize impact of noise generated by the new highway on nearby residential areas	MTO, MOE municipalities, area residents	Approximately 49 of the 214 homes currently within 600 m of the proposed alignment will experience noise level increases greater than 5 dBA.	MTO policy indicates that where increases exceed 5 dBA: • investigate noise control measures within the right-of-way • if project cost is not significantly affected, introduce noise control measures within the right-of-way • noise control measures where introduced, should achieve a minimum of 5 dBA attenuation averaged over the first row of receivers (NSAs) Mitigation measures relating to noise and vibration will be documented in a Design and Construction Report. With regard to construction noise, at the design stage, the MTO will carry out the following commitments: • Noise sensitive areas will be identified. • Applicable municipal noise control by-laws will be identified. Where timing constraints, or any other municipal by-law may cause hardship to MTO, an exemption will be sought. • An initial complaint from the public will require verification by MTO that the general noise control measures agreed to are in effect; MTO will investigate all noise concerns, warn the contractor of any problems, and enforce its contract. • Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with MOEE sound level criteria for construction equipment contained in the MOEE Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
Highway Construction Noise (cont'd)				• In selecting the appropriate construction noise control and mitigation measures, MTO will give consideration to the technical, administrative, and economic feasibility of the various alternatives. • Where pile driving or blasting may be necessary in noise sensitive areas monitoring will be determined an adopted by Ministry of Transportation policy pursuant to prevailing provincial legislation at the time of construction.
Community Effects (refer to Section 5.4.3.3)	Minimize the negative impact of the new road on homes, community features, and recreational areas/ practices	MTO, municipalities, interest groups, area residents, general public	Homes: By travelling mid-concession and utilizing available gaps in the developed countryside, the number of individual homes within the 15.3 km long Link right-of-way was kept to 6 (two each at Yonge Street, Bathurst Street and County Road 4). Community Features: The new route avoids entirely the area's community features such as schools, churches, cemeteries, parks and other public facilities. In improving access to Bradford and providing a new link across the Holland River valley, the facility will improve the attractiveness of existing facilities. Recreational Areas/Practices: The Link avoids the Scanlon Creek Conservation Area. The long-span high-level bridges across the two river branches will allow continuation of all water-based recreational activity such as boating, canoeing, fishing and birdwatching.	Where the bridge passes by Albert's Marina particular attention will need to be paid to mitigation of noise and visual intrusion on marina users in the design phase (e.g. location/ elimination of expansion joints, pier and substructure aesthetics, road surface drainage, noise deflectors, etc.). Similar consideration will need to be given to the facility design in the vicinity of the Silver Lakes Golf Course.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
ECONOMIC ENVIRONMENT				
Agriculture (refer to Section 5.4.4.1)	Preserve agricultural land and minimize negative impacts on agricultural operations	MTO, OMAFRA, agricultural property owners, general public	A total of 13 field crop and 3 livestock farming operations are affected by the proposed facility in the west section. A total of 7 specialty crop, 3 livestock and 5 field crop operations are directly affected by the proposed Link in the east and central sections. The total land area, currently in active agricultural production, directly affected by the proposed facility is 84.4 ha in the western section and 69.9 ha in the east and central section totalling 154.3 ha.	To minimize the negative effects of the route on agricultural operations and avoid major severances, the alignment is located mid-concession where possible, or along existing lot lines.
Commercial/Industrial (refer to Section 5.4.4.2)	Enhancr commercial/ industrial sector while minimizing negative impact on local businesses, particularly downtown Bradford	MTO, municipalities, interest groups	By the time of Link construction it would have little net negative effect on the economic viability of the town, and would in fact support commercial/industrial growth through improved access to the provincial freeway system and reduced truck use of local streets. The route passes through two lots on Artesian Industrial Parkway currently occupied by commercial businesses; they could be relocated to undeveloped lots nearby. The link will also impact property occupied by parts of Albert's Marina and the Silver Lakes Golf Club on either side of the Holland River East Branch, but the functional and economic viability of both enterprises will remain.	Part of the freeway plan will include signage orienting traffic towards downtown Bradford where appropriate. Consultation with Albert's Marina and Silver Lakes Golf Club will be necessary during the design phase to minimize impacts to each business; some reconfiguration of the facilities within each property will be needed.
Property Waste and Contamination (refer to Section 5.4.4.4)	Avoidance of waste/contaminated sites	MTO	The Link alignment avoids the only known landfill site in the study area (north side of 8th Line, west of the CN Rail line). However, it is possible that landfill waste or other contamination may be discovered during subsequent design or construction phases.	Any waste material or contaminated soils encountered will be managed in accordance with the requirements of applicable legislation, such as the Environmental Protection Act, and with applicable guidelines such as the MOEE Guidelines for Use at Contaminated Sites in Ontario. Measures to ease the contaminant of accidental spills will be considered in the design of stormwater management facilities for the Link.
Aggregates (refer to Section 5.4.4.5)	Avoidance of taking aggregate deposits out of current or potential production	MTO	There are no significant aggregate deposits on or adjacent to the Link right-of-way. A significant quantity of imported fill will be required for the Link roadbed.	Construction of the Link will support aggregate production in nearby pits and quarries.

Factor/Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect	Proposed Mitigation/Commitments to Further Work
CULTURAL ENVIRONMENT				
Archaeology (refer to Section 5.4.5.1)	Avoidance of known or potential sites of archaeological significance	MTO, MC$_Z$CR, interest groups, general public	The route passes well to the north of the early 19th century steamboat landing and transshipment point. A significant prehistoric/early historic site was discovered partly within the proposed right-of-way. The potential exists for other undiscovered archaeological sites at the Holland River East Branch and elsewhere within the proposed freeway right-of-way.	Once the specific nature and extent of archaeological resources impacted by the highway are identified, appropriate mitigation measures will be developed in accordance with the MTO/MC$_Z$CR guidelines.
Historical (refer to Section 5.4.5.2)	Minimize impact on significant historical elements of the built environment	MTO, MC$_Z$CR, interest groups, property owners, general public	No significant historical buildings and features are directly affected (within the right-of-way). One historically significant home (near Simcoe County Road 4) is within 100 m of the route.	Mitigation of visual impact of the Link through landscaping and other options will be investigated where appropriate.
APPLIED ENVIRONMENTAL CONDITIONS				
Stormwater Management (refer to Section 5.4.6.1)	Management of roadway runoff and stormwater so as to reduce impacts to the quality and quantity of surface and groundwaer	MTO, MNR, LSRCA	Stormwater runoff has the potential to severely impact the quality and quantity of surface and groundwater.	The objectives of the Plan will include: • When designing Stormwater Management Practices (SWMPs), consideration will be given to measures for reducing adverse environmental impacts to surface and groundwater. • Bridge runoff should be discharged to stormwater management facilities (preferably a pond or swale) prior to discharge to watercourses where this reasonably can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems.
Erosion and Sediment Control (refer to Section 5.4.6.2)	Protection of terrestrial and aquatic resources through limitation of soil erosion and sedimentation.	MTO, MNR, LSRCA	Soil erosion and sedimentation can potentially harm terrestrial and aquatic resources.	The identified right-of-way for the Link has been checked at locations of deep cut and fill to ensure that adequate property is shown to accommodate slope benching. Mitigation will include contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness;
Sustainable Development (refer to Section 5.4.6.3)	Avoidance of contributing to unsustainable development patterns.	MTO, general public	In supporting mobility of people and goods and in supporting the economic development of the study area (Bradford in particular), the Link may contribute to a reduction in dependence on long-distance commuting for residents of northern York Region as a significant proportion currently travel to jobs outside the area.	None.